

# CHEMICALS, ORGANISMS, AND PERSONS

MODAL EXPRESSIVISM AND A DESCRIPTIVE METAPHYSICS OF KINDS

by

Preston John Stovall

B.A., Montana State University, 2004

M.A., Texas A&M University, 2008

Submitted to the Graduate Faculty of

The Kenneth P. Dietrich School of Arts and Sciences

in partial fulfillment of the requirements for the degree of

Doctor of Philosophy

University of Pittsburgh

2015

UNIVERSITY OF PITTSBURGH  
KENNETH P. DIETRICH SCHOOL OF ARTS AND SCIENCES

This dissertation was presented

by

Preston John Stovall

It was defended on

May 6, 2015

and approved by

Robert Brandom (Director), University of Pittsburgh

John McDowell (Second Reader), University of Pittsburgh

Edouard Machery, University of Pittsburgh

James O'Shea, University College Dublin

Copyright © by Preston John Stovall

2015

# CHEMICALS, ORGANISMS, AND PERSONS

## MODAL EXPRESSIVISM AND A DESCRIPTIVE METAPHYSICS OF KINDS

Preston Stovall, Ph.D.

University of Pittsburgh, 2015

Sentences like ‘atoms of gold have 79 protons’ and ‘the book is in the library’ appear to represent the world in some way. But what role is played by modal sentences like ‘*necessarily*, atoms of gold have 79 protons’ and ‘*it ought to be that* the book is in the library’? Two sorts of answers to this question are common in contemporary philosophy, one that interprets modal sentences representationally, and the other interpreting them as expressions of some sort.

Modal expressivism and modal representationalism are often characterized as mutually exclusive, and this can make it seem like modal expressivism undercuts metaphysical inquiry. But in this document I develop a modal expressivism that is compatible with modal metaphysics. I do so by showing how to interpret a variety of object-language modal vocabularies, including terms for ontic modalities (‘necessarily’ and ‘possibly’), normative modalities (‘ought’ and ‘may’) and teleological modalities (‘in order to’ and ‘so that’), as devices for giving expression to the metalinguistic rules of inference that govern the representational terms and sentences of that object-language. On this basis I argue for a descriptive metaphysics—understood as a way the world would have to be if the way we reason about it were to be correct—for the very general kinds ‘chemical’, ‘organism’, and ‘person’. I also argue that a variety of grounding explanations, marked by two-place modal connectives like ‘because’ and ‘for this reason’, can be understood to play a role in relating different sentences to one another in a structured inferential space

involving no representational commitments beyond those that are implicated by ordinary explanations concerning the sentences on which those phrases operate.

The result is a view on which talk of organisms and persons as individuals that are, by their natures, creatures of excellence and defect is talk that commits us to nothing more than particular sorts of complexity in the ordinary causal and social relations that make organic and personal activity possible. And so whereas it might seem that metaphysics and modal expressivism are mutually exclusive projects, the modal expressivism I develop underwrites a novel method of metaphysical inquiry.

## TABLE OF CONTENTS

LIST OF FIGURES .....	XII
PREFACE.....	XIII
1.0 INTRODUCTION.....	1
1.1 MATERIAL INFERENTIAL RELATIONS AS AN EXPRESSIVIST BASIS FOR MODAL METAPHYSICS.....	1
1.1.1 PRELIMINARY REMARKS .....	1
1.1.2 TWO APPROACHES TOWARD MODALITY .....	5
1.1.3 OVERVIEW OF THE PROJECT .....	13
1.1.4 EXPRESSION, PROOF, AND MEANING .....	16
1.1.5 FORMAL AND MATERIAL CONSEQUENCE .....	20
1.1.6 EXTENSION AND COMPREHENSION .....	31
1.1.7 A DARWINIAN CONCEPTUAL GENEALOGY FOR MATERIAL AND FORMAL CONSEQUENCE RELATIONS .....	41
1.1.8 AN ABDUCTIVE INFERENCE FROM MODAL EXPRESSIVISM TO A DESCRIPTIVE METAPHYSICS OF KINDS .....	44
2.0 A MATERIAL INFERENTIAL INTERPRETATION OF THE SUBJUNCTIVE CONDITIONAL .....	50
2.1 A NON-MONOTONIC MATERIAL CONSEQUENCE RELATION.....	53

2.1.1	OBJECT-LANGUAGE, PROOF-LANGUAGE, AND METALANGUAGE.....	53
2.1.2	FORMAL AND MATERIAL CONSEQUENCE .....	57
2.1.3	MATERIAL RULES OF INFERENCE AND THE COMPREHENSIONS OF SIMPLE SENTENCES .....	62
2.2	INTRODUCING THE SUBJUNCTIVE CONDITIONAL .....	65
2.2.1	SUBJUNCTIVES, COUNTERFACTUALS, ‘EVEN IF’ CONDITIONALS, AND ‘ONLY IF’ CONDITIONALS .....	65
2.2.2	A WORRY ABOUT CIRCULARITY.....	69
2.2.3	MATERIAL INFERENCE AND THE REPRESENTATION OF FACT.....	73
2.2.4	THE SUBJUNCTIVE CONDITIONAL AND THE PROBLEM OF EFFABILITY.....	75
2.2.5	TWO-PLACE EXPLANATORY OPERATORS AND THE PROBLEM OF COMPREHENSION .....	77
2.2.6	PURELY PRAGMATIC VOCABULARIES AND A NOTE ON GROUNDING EXPLANATIONS.....	80
2.2.7	A REMARK ON MODEL THEORY AND PROOF THEORY .....	84
2.2.8	LOOKING AHEAD.....	85
3.0	A SUBJUNCTIVE INTERPRETATION OF THE ONTIC MODALITIES.....	87
3.1	THE STRONG AND WEAK ONTIC MODALITIES.....	88
3.1.1	INTRODUCING THE DEFINITIONS.....	88
3.1.2	ON THE DOMAIN OF QUANTIFICATION.....	89
3.1.3	ON THE NEGATION EQUIVALENCE BETWEEN THE STRONG AND WEAK ONTIC MODALITIES .....	94
3.2	THE WEAK ONTIC SUBJUNCTIVE CONDITIONAL.....	96

3.2.1	LEWIS' DEFINITION .....	96
3.2.2	'MIGHT' AND 'COULD' .....	97
3.2.3	SUMMING UP AND LOOKING AHEAD .....	102
4.0	A SUBJUNCTIVE INTERPRETATION OF KIND TERMS.....	104
4.1	ON THE COMPREHENSION OF KIND TERMS .....	105
4.1.1	MODALITY AS REPRESENTING THE WORLD AND AS GUIDING OUR REASONING .....	105
4.1.2	FROM TRUTH IN A MODEL TO PROOF IN A LANGUAGE: CIRCUMSTANCES AND CONSEQUENCES OF APPLICATION .....	108
4.1.3	A MATERIAL INFERENTIAL INTERPRETATION OF KIND TERMS—MEDIATING THE SINGULAR WITH UNIVERSALITY .....	112
4.2	FROM CIRCUMSTANCES AND CONSEQUENCES OF APPLICATION TO CRITERIA OF IDENTITY AND INDIVIDUATION .....	120
4.2.1	BACKGROUND .....	120
4.2.2	CRITERIA FOR IDENTIFYING AND INDIVIDUATING A CRITERION OF IDENTITY AND INDIVIDUATION.....	123
4.2.3	EXTENSIONAL AND INTENSIONAL CRITERIA OF IDENTITY AND INDIVIDUATION .....	125
4.2.4	EXPLANATION AS THE EXPRESSION OF CRITERIA OF IDENTITY AND INDIVIDUATION.....	130
4.2.5	FROM A MATERIAL INFERENTIAL MODAL EXPRESSIVISM TO A DESCRIPTIVE METAPHYSICS OF KINDS .....	134
5.0	ON THE REPRESENTATIONAL DIMENSIONS OF MODAL EXPRESSIVISM	137



5.1	MODAL EXPRESSIVISM: ITS PROMISE AND PROBLEMS.....	141
5.1.1	THE PROMISE OF EXPRESSIVISM AS AN ALTERNATIVE TO REPRESENTATIONAL THEORIES OF MODALITY .....	141
5.1.2	MODAL EXPRESSIVISM: THREE PROBLEMS.....	143
5.1.3	REALISM AND REPRESENTATION IN MODAL DISCOURSE.....	145
5.1.4	A PRAGMATIST DEFENSE OF THE BIFURCATION THESIS: THREE CRITERIA OF ADEQUACY .....	148
5.2	SIX GRADES OF MODAL REPRESENTATIONAL COMMITMENT.....	150
5.2.1	THE SECOND GRADE OF MODAL REPRESENTATIONAL COMMITMENT: WHAT DISCURSIVE PRACTICE DOES REPRESENTATIONAL VOCABULARY MAKE EXPLICIT? .....	150
5.2.2	THE THIRD GRADE OF MODAL REPRESENTATIONAL COMMITMENT: THE I- REPRESENTATIONAL DIMENSIONS OF SUBJUNCTIVE CONDITIONALS.....	153
5.2.3	THE FOURTH GRADE OF MODAL REPRESENTATIONAL COMMITMENT: I- REPRESENTATION AS A FUNCTION OF LINGUISTIC REVISION .....	156
5.2.4	RESPONDING TO THE CHARGE OF CONVENTIONALISM .....	158
5.2.5	FROM THE FIFTH TO THE SIXTH GRADE OF MODAL REPRESENTATIONAL COMMITMENT: FROM SPATIO-TEMPORAL LOCATION TO THE ‘IS’ OF CONSTITUTION.....	160
5.2.6	CONSTITUTION AND MODALITY .....	163
5.2.7	LOOKING AHEAD: FROM OBJECT-LANGUAGE USES OF THE ONTIC TO THE TELEOLOGICAL AND NORMATIVE MODALITIES .....	166

6.0	THE SUBJUNCTIVE BACKGROUND OF THE TELEOLOGICAL MODAL PROFILE OF ORGANIC GENERATION AND GROWTH .....	169
6.1	DRAWING A PRINCIPLED DISTINCTION BETWEEN THE CHEMICAL AND THE ORGANIC .....	171
6.1.1	THE BOUNDARY PROBLEM .....	171
6.1.2	ARISTOTELIAN AND KANTIAN RESPONSES TO THE BOUNDARY PROBLEM .....	176
6.1.3	DARWIN'S HYPOTHESIS AS A THIRD RESPONSE TO THE BOUNDARY PROBLEM .....	179
6.2	ON THE PURPOSIVE CHARACTER OF ORGANIC GENERATION AND GROWTH .....	183
6.2.1	COLLECTING A SET OF EXPLANATORY DESIDERATA .....	183
6.2.2	INTRODUCING ORGANISM-ENABLED SUBJUNCTIVE STABILITIES .....	187
6.2.3	PUTTING OESSs TO USE .....	194
6.2.4	ON REPRESENTING NATURE AS PURPOSIVE.....	205
6.2.5	ON THE DECOMPOSITION OF ORGANIC PURPOSE AND VALUE TO STRUCTURED SUBJUNCTIVE RELATIONS .....	208
7.0	HUMAN PERSONS ARE CREATURES OF RATIONAL SELF-DETERMINATION .....	210
7.1	ON THE STRUCTURE AND UNITY OF ORGANIC GENERATION AND GROWTH RECONSIDERED .....	215
7.1.1	THE IDENTITY AND INDIVIDUATION OF OBJECTS IN SPACE AND TIME .....	215
7.1.2	ON THE STRUCTURE OF ORGANISM-ENABLED SUBJUNCTIVE STABILITIES .....	218
7.1.3	SPECIES AND GENERA.....	227

7.2	ON THE STRUCTURE AND UNITY OF HUMAN PERSONS .....	231
7.2.1	PERSONAL AGENCY AS THE REPRESENTATION OF RULES .....	231
7.2.2	THE GROUND OF THIS VIEW IN PRACTICES OF REASONING .....	239
7.2.3	RETURNING TO AQUINAS.....	243
7.2.4	ON THE NATURE OF RATIONAL WILL AND VALUATION .....	245
8.0	CONCLUSION AND NOTES FOR FURTHER WORK .....	250
	APPENDIX A: ARBITRARILY RIGHT AND LEFT NESTED SUBJUNCTIVES .....	262
	APPENDIX B: IMPORT/EXPORT FOR SUBJUNCTIVES IN THE OBJECT-LANGUAGE AND CUMULATIVE UPDATING IN THE METALANGUAGE.....	264
	APPENDIX C: IMPORT/EXPORT IN A POSSIBLE WORLDS SEMANTICS .....	270
	APPENDIX D: PROOF OF $(\exists P)\sim(P > \sim\Phi) \Leftrightarrow (\exists P)(P > \Phi)$ ON A LEWISIAN FRAME.....	274
	APPENDIX E: VALIDATING A PRINCIPLE OF INFERENCE .....	278
	BIBLIOGRAPHY.....	285

## LIST OF FIGURES

Figure 1: The Two-Dimensional Structure of OESSs .....	221
Figure 2: An Analysis of Figure 1 .....	222
Figure 3: A Set of OESSs with More Detail.....	223
Figure 4: Partial OESS Structure of a Cactus .....	228
Figure 5: Partial OESS Structure of a Fern.....	229
Figure 6: $\varphi > \chi$ .....	270
Figure 7: $\varphi > \sim(\chi > \sim\varphi)$ .....	271
Figure 8: $\sim(\varphi > (\chi > \sim\varphi))$ .....	272

## **PREFACE**

I am gratefully indebted to a number of individuals, faculty and fellow students, for constructive criticism of my views as they have developed over the course of my education. Here I wish to express particular thanks and gratitude for the time and energy that the members of my committee have devoted toward helping me with the current project. John McDowell's patient attention to detail and often novel perspectives on well-worn issues has inspired me to be careful both in what I say and in what I assume in saying it. Edouard Machery has kept me mindful of the fact that philosophical speculation is only as valuable as it is sensitive to facts the determination of which is not a matter of speculation, and throughout the dissertation I have tried to keep my claims circumscribed by that restriction. To Jim O'Shea I owe a debt for his continual encouragement and constructive evaluation, both concerning the dissertation and in matters of the profession more generally. Finally, Robert Brandom has been selfless with his time and interest, meeting with me nearly every week for close to three years during the semesters in which I have been writing. His synthetic command of both the details of particular philosophical positions and the situation of those positions in their historical and conceptual context has been a point of aspiration throughout this project. Anything of merit in this document is owed to the criticism and support that I have received over the course of its composition.

## 1.0 INTRODUCTION

### 1.1 MATERIAL INFERENTIAL RELATIONS AS AN EXPRESSIVIST BASIS FOR MODAL METAPHYSICS

*Not that the story need be long, but it will  
take a long while to make it short.*

Henry David Thoreau

#### 1.1.1 PRELIMINARY REMARKS

The current project is motivated by certain orientations in the philosophy of language and the history of philosophy. Three central orientations—one concerning expressivism in the philosophy of language, another concerning non-extensional dimensions of meaning, and a third in the use of proof-theoretic tools in working out the details of the view—will help situate the project to follow. These points of orientation can be marked by contrast with their more common alternatives. First, the focus on the expressive role of lexical items, particularly modal terms, is one that diverges from the more common representational approach toward language and thought. This point of orientation is center-stage throughout the project. The second orientation, emphasizing a historical tradition that works with a non-extensional component of meaning, will operate

mostly in the background though it will be considered in some detail in this introduction. In the project itself this idea lies behind the use of material inferential relations (which can be thought of as those inferences that are underwritten by what it is to be something) as a means for interpreting rational connections among different sentences. Roughly, whereas some inferences are good in virtue of the rules that govern certain logical terms like ‘and’ and ‘not’, material inferences are good because of facts concerning the objects referred to in the sentences occurring in those inferences. Finally, the proof-theoretic approach is to be contrasted with a model-theoretic alternative; here the emphasis is on the rules that govern the use of the terms of a language as opposed to an interpretation of those terms via objects in a model.

These three points of orientation line up as an outline for the project as follows: whereas the representationalist understands object-language sentences via set theoretic constructions out of extensions given in a model, the material inferential expressivism developed below will interpret a range of object-language locutions as devices for expressing commitment to the proof-theoretic structure, understood in terms of material inferential relations, that governs the language. In the course of developing this view I will argue that a variety of object-language claims that appear to represent the world, and which have often been the topic of metaphysical speculation, can be understood in terms of the role they play in giving expression to structural features of the rules of inference that govern the sentences of the language. Just as the model-theoretic representationalist accounts for modal terms via the addition of set-theoretic structure among the extensions given by the model, positing new sorts of referents, this proof-theoretic approach will look to additional forms of structure in the proof system so as to account for more complex forms of object-language expression.

The result will be that talk about large-scale metaphysical differences between things like salt and moss, geological process and organic speciation, can be understood as talk that gives expression to the material inferential structure of a background language consisting of ordinary world-representing sentences. In this way it will be possible to use the rules of inference governing different kind terms and modal operators as a means of delineating a descriptive metaphysics for kinds—a metaphysics we are committed to in virtue of our practices of reasoning about different kinds of individual. The first half of the dissertation develops a view on which 1) the subjunctive conditional can be understood in terms of a material consequence relation; 2) the ontic or world-describing modalities for necessity and possibility can be understood as universal and existential quantification over the antecedents of subjunctive conditionals (e.g., ‘ $\phi$  is necessary’ becomes ‘no matter what,  $\phi$  would be the case’); and 3) the material inferential role of kind terms can be understood via their occurrences in those subjunctive conditionals that figure in certain sorts of explanations. Within this framework a variety of modal claims concerning different kinds can be understood as giving expression to the inferential space that governs the use of the corresponding kind terms. I take the representational commitments of this view to be a point of orientation in the second half of the dissertation. There I proceed by extending the material inferential modal expressivism developed in the first half to a consideration of normative, teleological, and imperatival vocabulary and the high-level or metakinds *chemical*, *organism*, and *person*. My contention is that talk of purpose and value in nature does involve certain representational commitments, but that these commitments can be understood as complexes of ordinary representational commitments spelled out via subjunctive conditionals. I will furthermore argue that so-called ‘grounding explanations’ like ‘because’ and ‘for this reason’ involve us in *no* new representational commitments beyond those involved in first-order inquiry, instead playing a



purely pragmatic role—they serve to relate sentences to one another in a space of inference without importing any representational commitments beyond those that are implicated by ordinary explanations concerning the sentences on which those phrases operate.

To get some idea of what this will involve, consider the following paragraph. It is the aim of this dissertation to defend two broad theses about the claims made here. First, that talk of identity, constitution, purpose, and value in this paragraph gives expression to ontological commitments that partition the space of possibility concerning chemicals, organisms, and persons. And second, that the italicized terms in this paragraph do not contribute any new representational content to these sentences, instead functioning as devices for giving expression to inferential relations concerning 1) the modal consequences pertaining to the notions of identity and constitution, and 2) the rational relations that such terms as ‘human organism’ ‘person’ and ‘mechanical process’ stand in to one another given their conditions of identity and constitution:

We are each of us identical with the human organism we are, and *in virtue of* this identity our lives as persons are bound up with the purposive and normative valences we carry as organisms. But as persons we are capable of rational self-government, and *for this reason* we are different in kind from the merely organic. Nevertheless, considered *qua* the collections of electro-chemical and mechanical processes that constitute organic bodies there are no natural purposes. This is *because* the relation of constitution is not that of identity, *so that* the modal profiles of our organic and personal existences do not pertain to the collections of chemical stuffs that constitute us at any given time. *In virtue of* these facts an ungrudging recognition of the existence of natural purposes, and the artificial purposes made possible by persons, is

compatible with an order of understanding along which there are no purposive events in the world.

In the first half of the dissertation I develop a view on which the italicized phrases are purely pragmatic, involving us in no representational commitments beyond those which we incur by asserting the sentences they operate on, and instead functioning to express commitment to features of the proof-system that governs the inferential roles of those sentences. In the second half of the dissertation I defend the claims made in that paragraph as a set of representational commitments implicated by the rules that govern the uses of different modalities and kind terms. In this way the material inferential modal expressivism of the first half of the project makes possible the descriptive metaphysics of kinds undertaken in the second.

The rest of this introduction places the project and its goals within the traditions and problems it addresses itself toward. By surveying some of the contemporary landscape and corresponding historical approaches toward modality and metaphysics I hope to give the reader some sense of what is to come and why it is worth working through.

### 1.1.2 TWO APPROACHES TOWARD MODALITY

Sentences like ‘atoms of gold have 79 protons’ and ‘the book is in the library’ appear to represent the world in some way. But what role is played by modal sentences like ‘*necessarily*, atoms of gold have 79 protons’ and ‘*it ought to be that* the book is in the library’? There are two prominent answers to this question, one that interprets modal sentences representationally, and the other interpreting them as expressions of some sort. The representational answer is most close-

ly associated with possible worlds analyses of the modalities for necessity and possibility. On this conception the sentence ‘necessarily, atoms of gold have 79 protons’ is no less representational than its nonmodal component sentence, though what is being represented is a set of possible worlds rather than the actual world by itself. Expressivism, by contrast, is most well-known as a theory of the normative modalities. On this view, sentences concerning what agents ought and ought not do are interpreted in terms of the positive and negative attitudes one expresses when asserting those sentences. As expressions of attitude, the thought runs, these modal claims need not represent anything.

That modal assertions would be interpreted as descriptions of states of affairs is not surprising given the grammar characteristic of such assertions. This suggests the following generalization: what one is *doing* in asserting a sentence is *representing* that things are thus-and-so. But a sentence with a declarative surface grammar can be used to issue a variety of speech acts. “You ought to be more productive during the morning” can carry a range of significances in conversation. Said from one friend to another it can be a suggestion or piece of advice. Said from an employer to an employee it can be a command. In both such contexts a sentence that has a descriptive surface grammar plays the role of some species of imperative.<sup>1</sup> At other times a modal assertion can be used to help triangulate agency in the context of a shared activity. An utterance of “The cups might break if they aren’t wrapped in packing paper” has the appearance of a description, but its assertion can help guide the decisions of the auditors with regard to how they handle the cups in question. These cases suggest that it is not a cut-and-dried fact that modal assertions can be adequately characterized simply as attempts to represent the world (or the

---

<sup>1</sup> The same is true of other sorts of sentences. “Can you hand me the putty blade?” is grammatically a question, but its use in context can make it a request or a command given the social relations between the speaker and hearer.

space of possible worlds)—sometimes they are more properly thought of as expressing guidelines for how to reason about or act within the world. In issuing modal assertions, the suggestion runs, we are not (only) describing how other worlds are but (also) expressing rules for reasoning about the objects and properties that populate the actual world.

While expressivism is most commonly associated with the normative modalities, a number of figures have argued for expressivism about the ontic modalities as well. Some (e.g. Blackburn 1987 and Price 2008) trace this view to Hume, though Wilfrid Sellars (1953, 1958) and Robert Brandom (2008, 2014) have developed expressivist theories of modality with roots in Kant and Hegel (Price 2011a compares Humean and Hegelian versions of modal expressivism).<sup>2</sup> Over the last half-century modal claims have been most commonly understood by philosophers and linguists in terms of the truth of nonmodal claims at various points of evaluation, often glossed with the term ‘possible worlds’. Beginning with the work of Robert Stalnaker (1968) and David Lewis (1973) in the late 60’s and early 70’s this approach was also used to provide an account of the subjunctive conditional.<sup>3</sup> On this view a subjunctive conditional like ‘if the glass were dropped it would break’ is true at a world  $w$  just in case the consequent is true at the class of worlds *most similar* to  $w$  where the antecedent is true.

While not universally accepted, and though some recent work motivates alternatives (e.g. the powers theory of modality in Jacobs 2010, Fine’s possible states in his 2012b, the temporal interpretation of subjunctives in Ippolito 2013, and the dynamic semantics of Starr 2014), possi-

---

<sup>2</sup> In his “Autobiographical Reflections” (1975 p.285) Sellars writes of his time at Oxford under a Rhodes Scholarship:

I had already broken with traditional empiricism by my realistic approach to the logical, causal, and deontological modalities. What was needed was a functional theory of concepts which would make their role in reasoning, rather than a supposed origin in experience, their primary feature. The influence of Kant was to play a decisive role.

<sup>3</sup> Pollock (1976), Kvart (1986) and the work downstream from Kratzer (1977) should also be mentioned.

ble worlds analyses have been a point of orientation in work on modality in philosophy and linguistics since the 1960s. But in a series of early papers (1948, 1949, 1953, 1958) Wilfrid Sellars worked out the beginnings of a view on which these logical operators are interpreted as devices for expressing commitment to rules of inference while remaining in a world-representing mode of discourse. The view is founded on an idea suggested by Carnap's (1934) distinction between two modes of discourse—in the object-language mode we purport to be talking about objects and their properties, and in the metalinguistic mode we give expression to the rules that govern the use of language.<sup>4</sup> Carnap suggested that these two modes of discourse were diaphanous in the sense that some of what is said in the former, though having the surface-grammar of prosaic claims about the world, is really a transposition into that mode of what is better thought of in terms of rules of inference. Adopting this idea Sellars (1953) argued that the assertion of a subjunctive conditional could be thought of as the object-language expression for what would be given, in the metalanguage, as a rule of inference.<sup>5</sup> But whereas some inferences are good in virtue of the formal rules that govern the logical operators, Sellars thought that the subjunctive conditional (at least in some cases) gives voice to *material* rules of inference. I will refer to this as a *material inferential interpretation of the subjunctive conditional*. In the course of developing his view Sellars argues that terms like 'necessarily' and 'possibly' are object-language means for

---

<sup>4</sup> Carnap uses the terms 'material' and 'formal' to denote these two modes, but as I will be discussing material and formal *consequences* or *inferences* later, and because 'material' and 'formal' mean something different in that context, I use 'object-language' and 'metalanguage' to characterize Carnap's talk of the material and formal modes of discourse.

<sup>5</sup> From Sellars (1953), pp.15-16 (emphasis in the original):

[E]ven though material subjunctive conditionals may be dispensable, permitting the object language to be extensional, it may nevertheless be the case that the *function* performed in natural languages by material subjunctive conditionals is indispensable, so that if it is not performed in the object language by subjunctive conditionals, it must be performed by giving direct expression to material rules of inference in the meta-language. *In other words, where the object language does not permit us to say "If  $a$  were  $\phi$  it would be  $\psi$ " we can achieve the same purpose by saying "' $\psi a$ ' may be inferred from ' $\phi a$ '".*

marking off structural features of the inferential relations of a sentence at a context (see especially his 1949 and 1958). I will develop this idea as a *subjunctive interpretation of the ontic modalities*. Sellars never develops these ideas in any detail, and by the time possible worlds interpretations of the ontic and subjunctive modalities came into their maturity during the 1970's he had moved on to projects he understood to be consequent from this earlier work. While Robert Brandom (2008, 2014) has developed these themes in Sellars in various ways, and while other modal expressivists like Huw Price (unpublished) and Amie Thomasson (2009) have begun to engage with Sellars as well, to date there has been no effort to work out Sellars' view in a way sufficient to show that it can be constructively juxtaposed with a possible worlds interpretation of these logical devices.

One juxtaposition worth considering concerns the contrast between expressivist emphases on the *use* of modal terms and representational interpretations of what they appear to *say*. In recent work Amie Thomasson has defended an expressivism for the metaphysical modalities that deflates their representational roles (2007 and 2009). She thinks of modal sentences as devices for issuing metalinguistic commands for the use of terms while remaining in the object-language. On her view, also descended from Carnap (1934), uses of metaphysical modal sentences allow us to say in the indicative what would otherwise require an imperativial grammatical form, so that they allow us to use object-language descriptive vocabulary to make a point that is properly thought of as a metalinguistic command. And by adopting an indicative grammar we can employ metaphysical modality in contexts of reasoning, embedding them as the antecedents of conditionals, for instance.<sup>6</sup> If we can make sense of what we are doing in using metaphysical mo-

---

<sup>6</sup> This claim deserves more attention, as there is an interesting response to the Frege/Geach point here.

dality without appeal to representations of, e.g., essences, then it would seem otiose to posit such entities, and questions about how we come to *know* a modal fact thereby resolve themselves into questions of how we come to *follow* a command. In a similar vein Huw Price has argued that the use of modal vocabulary need not commit us to metaphysically spooky entities or epistemic relations. In his (2004) he motivates what he calls *subject naturalism*—the view that the practices or abilities that language-users deploy in learning to use a vocabulary must be naturalistically intelligible. On this basis Price is able to deflate the ontological commitments that those vocabularies, when read representationally, seem to involve. For so long as we can tell a naturalistic story about how people came to *use*, e.g., terms for universals and modality, we do not need to worry that the representational surface grammar of such uses appears naturalistically problematic. In his (2014) Price argues that his is a project in philosophical anthropology rather than metaphysics, and this in the sense that he is not interested in “a reductive *analysis* of [the concepts at issue]” but instead in “the anthropological project of explaining [their] genealogy and use” (2014, p.6). Once again representational commitments apparently incurred by the use of modal vocabulary are minimized by an expressivism that focuses on features surrounding the *use* of those terms.

On this construal Sellars, Brandom, Price, and Thomasson all count as ontic modal expressivists. Sellars and Brandom go in for a *material inferential modal expressivism*, one that holds that the notion of *expression* (or what is ‘conveyed’ but not said, to use Sellars’ idiolect) should be spelled out (at least in part) in terms of material rules of inference. And this lets us draw the modal expressivist and the modal representationalist closer together. For notice that it is compatible that the expression of a material rule of inference also represents the world, so that one need not suppose that modal representational commitments are ruled out by modal expres-

sivism. For the Sellarsian the use of a subjunctive conditional is understood as the expression of an inferential relation, so that what one is *doing* in using a subjunctive is expressing that an inference is good. But it can happen that at the same time one is *saying something* about the objects denoted in that conditional.<sup>7</sup> Sellars' claim in "Inference and Meaning" (1953, p.21) that "the language of modality is interpreted as a "transposed" language of norms" received a fuller treatment in the 1958 paper "Counterfactuals, Dispositions, and the Causal Modalities", and here expressing and representation do seem to be more closely connected. In that paper Sellars argues that our cognitive grasp of individual objects turns on our capacity to track their characteristic activities by placing them in a space of subjunctive reasoning, anticipating how different objects would and would not interact with other objects in various contexts. Ontic modal terms like 'could' and 'cannot' are then interpreted as devices for expressing the subjunctive robustness of certain of our claims about objects and their properties. We need devices for marking these ranges of subjunctive robustness, for it is only by tracking objects and properties in a space of interaction with other objects and properties that we have any cognitive grip on the world. That the glass cup might break if dropped, and that it would do so even if painted a different color, but not if covered in bubblewrap, and this because the cup is glass, are facts about the cup, bubblewrap, and paint as the kinds of things they are (in the case of the cup, that it is composed of a certain kind of stuff). In talking about what different objects would and would not, could and could not do we are in a straightforward sense *saying* something about the kinds of properties they possess. But, the Sellarsian urges, what we are *doing* in using those terms is expressing commitment to features of the inferential space within which those objects are situated in the

---

<sup>7</sup> This distinction between saying and doing is owed to Brandom (2008).



language, and the practices surrounding the use of modal terms should not be lost sight of at the expense of an emphasis on what those terms appear to represent.

The fact that Sellars frames his view with an object-language/metalinguage distinction has led some commentators to group Sellars with Chisholm (1946) and Goodman (1983—originally published in 1954) in defending a metalinguistic account of the truth conditions for counterfactuals that treats them as enthymematic entailments. On this approach a subjunctive is true just in case there is some set of sentences that, together with the antecedent, entails the consequent.<sup>8</sup> This grouping is unfortunate as Sellars abdicates the effort to analyze the subjunctive conditional in this way. Instead it is read as the expression of a (non-enthymematic) material rule of inference. Sellars' talk of subjunctives as object-language expressions for what (in the metalanguage) are expressed by rules of inference should be kept distinct from the notion of a metalinguistic interpretation of counterfactuals as pursued by Goodman and Chisholm. For the metalinguistic theories of the subjunctive conditional advanced by Goodman and Chisholm share with the possible worlds analysis a picture on which the truth of a subjunctive can be explained by the truth of ordinary sentences supplemented either by a set of auxiliary hypotheses that, together with the antecedent of a subjunctive, entail its consequent, or in terms of a notion of similarity across possible worlds. By contrast, any view that takes material rules of inference for granted in explaining the subjunctive conditional must explain why those rules are warranted. In the chapters to follow I will argue that an important, though by no means exhaustive, condition for endorsing what rules of inference we do (and so asserting what subjunctive conditionals we

---

<sup>8</sup> Chapter 20 of Bennett (2003), for instance, groups Sellars in with those who advocate what Bennett calls a Support condition, which states that a subjunctive is true just in case there is a true proposition that, in conjunction with the antecedent and the laws of nature, entails the consequent (p.302; cf p.312 for Bennett's attribution of this view to Sellars).

do) is our understanding of individuals as classified under various kinds. By the material inferential interpretation of the subjunctive conditional, then, our use of kind terms in explaining why a given subjunctive is true gives expression to our understanding of that subjunctive as a means of communicating a rule of inference that governs the kind term in question. Because the subjunctive can also be read as *saying something* about the world, this makes available a novel approach toward the metaphysics of kinds.

### 1.1.3 OVERVIEW OF THE PROJECT

The current project develops a material inferential modal expressivism so as to show that it bears important consequences for how we should think about metaphysical inquiry. But the resurgence of metaphysical inquiry in analytic philosophy was facilitated by the rise of possible worlds semantics. Given the indebtedness that metaphysics owes to possible worlds interpretations of modality, and given the anti-representationalism characteristic of expressivism, it might seem that an expressivist interpretation of modal vocabulary would undercut modal metaphysical projects. This appearance is misleading, however, and this dissertation lays out a modal expressivism that underwrites and makes possible a distinct form of metaphysical inquiry.

In particular, I will investigate an interconnected set of relationships among various modal operators, the rules of inference that govern them, and the different classes of kind term that are characteristically used in justifying assertions made under these modalities. In doing so I argue that by attending to these relationships we gain some measure of understanding concerning what our practices of reasoning commit us to by way of a very general metaphysics for the high-level or metakinds *chemical*, *organism*, and *person*. The modal terms I am interested in are: the

subjunctive conditional (where this includes both the properly counterfactual ‘if  $\phi$  had been the case then  $\psi$  would be case’ and the noncounterfactual ‘if  $\phi$  were to be the case then  $\psi$  would be the case’); the ontic modalities for necessity and possibility (expressed with terms like ‘cannot’ and ‘could’), and the teleological modalities for purposive states and acts (expressed with two-place operators, like ‘so that’ and ‘in order to’, relating means to ends—though in some contexts ‘so that’ functions as an intensional conjunction meaning ‘and for this reason’). I will also discuss the normative modalities for how things ought and may *be*, the deontic modalities for what an agent ought and may *do*, and evaluative predicates for excellence, defect, and various types of flourishing. In the last chapter I will look at the role of imperatives in teleological contexts as they are used in practices involving persons. Different modalities are governed by different rules of inference, and in what follows I use the introduction and elimination rules of a logical operator, or more generally the circumstances and consequences of application of a term at a context, as a guide for understanding surrounding bits of the linguistic landscape.<sup>9</sup>

As mentioned at the end of the first section the dissertation itself is divided into two halves—the first motivates and develops a view of the assertion of a subjunctive conditional as the expression of an inference, of the ontic modalities as quantifications over the antecedents of subjunctive conditionals, and of the role of kind terms as they are used in justifying certain subjunctive conditionals. This will put us into a position to see an interconnected set of object-language claims about kinds and their powers as code for the rules of inference that govern different classes of vocabulary. The second half of the dissertation puts this account to use in look-

---

<sup>9</sup> Introduction and elimination rules were used to give definitions for logical vocabulary in the sequent calculi of Gerhard Gentzen (1934, 1935) and the natural deduction systems of Dag Prawitz (1965), while Michael Dummett (1981, e.g. pp.74-6, 453-6) discusses the more general notion of the circumstances and consequences of application of a term in order to offer a correlative treatment of non-logical vocabulary.

ing at the role that ontic, teleological, normative, and imperatival vocabulary plays in our reasoning about (and, in the case of persons, with) chemicals, organisms, and persons. As I see it there are two key divisions in the metaphysical side of the project: first, we should have some account of the difference between, on the one side, chemical things as objects the understanding of which needs government only from the ontic (nomological, temporal, etc.) modalities, and on the other organisms and persons as things the understanding of which employs talk of purpose and value; and second, within that second category, we need to make sense of the difference between the teleological and normative modal profile of persons and that of the merely organic.

If this material inferential modal expressivism really does bear on questions of metaphysics then it must be the case that certain questions concerning what is represented in modal judgments of purpose and value can be answered. For it might be supposed that an attribution of purpose to an organism will, simply as such, represent the organism as being prospectively guided by a future state as a rule or guide for its activity. But action that proceeds by representation of a future state as a rule that prescribes behavior would seem to be the prerogative of *minded* activity, especially as found in the lives of persons. If the attribution of organic purpose were to represent the world in ways that were illicit by the lights of what we otherwise believe to be the case, there would seem to be little counsel but to either reduce or eliminate talk of organic purpose. For this reason it would count as a significant vindication of a modal expressivist position that it could specify the representational commitments involved in attributing organic purposes without either reifying natural purpose across nature or supposing that purposes simply did not exist. And so, after a material inferential modal expressivist account for the subjunctive conditional, the ontic modalities, and kind terms is in form at the end of chapter 4 of the dissertation,

the representational commitments of modal vocabulary will be a guiding theme of the metaphysical project occupying chapters 5-7.

This work did not arise in a vacuum and, though historical concerns will operate almost entirely in the background, this project lays out, defends, and puts to use an interconnected set of commitments that have been substantially shaped by a reading of certain trends in the history of logic and metaphysics. A variety of commonplace assumptions in contemporary debates in metaphysics and the philosophy of modality have precursors in some of the views and conversations that pepper the history of European philosophy, and by considering some of the alternative points of view that have been offered in the past it is possible to rethink some of the conceptual landscape, the space of possible options, within which the philosopher and logician pursue their projects. Though it goes beyond the current work to justify the value of historical perspective on contemporary debates, a survey of the history of some of these issues may help to bring the rest of the dissertation into relief. And so in the remainder of this introduction I will discuss the historical background to the material inferential modal expressivism defended in the first half of the dissertation, survey the descriptive metaphysics of kinds this expressivism makes possible in the second half of the project, and outline the dissertation itself.

#### 1.1.4 EXPRESSION, PROOF, AND MEANING

Brandom goes some way toward showing that Sellars' views about modality have antecedents in Kant (or a certain reading of him; cf. the discussion of the Kant-Sellars Theses of chapters 4 and 5 of Brandom's 2008). But ideas in the vicinity of Sellars' inferential interpretation of the subjunctive conditional and the ontic modalities can be found in the work of other figures as well,

and questions of the interaction among modality, inference, and the conditional stretch back to antiquity. It is somewhat striking that this material seems not to be drawn on much in the recent literature. Questions about the need for a logic sensitive to relevance conditions, often couched in terms of grounding or explanatory connections, take center stage in the development of scholastic logic. This research fared poorly with the rise of humanism and the tendencies toward either stripped-down classical learning or novel logical speculation that followed that rise, and in the wake of the successes of extensional mathematical logic as developed from the middle of the 19<sup>th</sup> century onward the logical research of the preceding centuries has often been dismissed out of hand.

Given the history of the history of logic in the 20<sup>th</sup> century it is not surprising that the notion of material inferences or consequences has gone neglected. Owing to the development of extensional (particularly set-theoretic) resources and their application to issues in the foundations of mathematics in the 19<sup>th</sup> century, many of these commitments no longer show up as live options for us.<sup>10</sup> Though figures and ideas that were lost in the rational reconstructions that came to prominence in the middle of the 20<sup>th</sup> century are now beginning to make appearances in the discussions surrounding the revolution that logic underwent in the 19<sup>th</sup> century (cf. Peckhaus 2009), it is important to recognize that for much of the 20<sup>th</sup> century these figures were treated dismissively by those who wrote the history of logic. In response to Carl B. Boyer's (1968) claim that "The history of logic may be divided, with some slight degree of oversimplification, into three stages: (1) Greek logic, (2) scholastic logic, and (3) mathematical logic" Volker Peckhaus writes (2009, p.160):

---

<sup>10</sup> Nimrod Bar-Am's *Extensionalism: The Revolution in Logic* (2008) provides a powerful articulation of the view that the development of the extensional resources of mathematical logic was a progressive one.

...Boyer's "slight degree of oversimplification"...enabled him to skip 400 years of logical development and ignore the fact that Kant's transcendental logic, Hegel's metaphysics, and Mill's inductive logic were called "logic", as well.

Boyer's claim is not an isolated instance of this phenomenon. Two of the foundational texts for 20<sup>th</sup> century treatments of the history of western logic, Bochenski's *Formale Logik*, published in German in 1956 and in English as *A History of Formal Logic* in 1961, and Kneale and Kneale's *The Development of Logic* (1962), display similar circumscriptions in the scope of their discussions. Bochenski identifies 4 varieties of logic (ancient, scholastic, mathematical, and Indian) whose work is taken as relevant for tracing the origins of formal logic and in a 450 page book he devotes 11 pages to "The Transitional Period" between "The Scholastic Variety of Logic" and "The Mathematical Variety of Logic" (three of those pages are given over to diagrams). At p.298 of Kneale and Kneale (1962) they write of logic during and immediately after the Renaissance that:

Although the subject survived in the elementary instruction of universities, it no longer attracted the attention of many of the best minds. From the 400 years between the middle of the fifteenth and the middle of the nineteenth century we have in consequence scores of textbooks but very few works that contain anything at once new and good.

Often 20<sup>th</sup> century work on the history of logic proceeds from a restricted conception of logic, and this explains some of the partiality we see in these discussions—Lewis (1918) is concerned with *symbolic* logic, Bochenski (1961) with *formal* logic, and Kneale and Kneale (1962) write that their primary purpose "has been to record the first appearances of those ideas which seem to us most important in the logic of our own day" (p.v). For this reason they do not worry

about induction and write that Francis Bacon “did not suggest any development of logic in that sense of the word which interests us, and we need not consider his theory of induction” (p.310). This exclusion of non-deductive reasoning from logic is itself common in the history of the development of mathematical logic—the work of George Boole and his follower William Stanley Jevons was in direct opposition to the logic of the inductive sciences advanced by people like John Stuart Mill and Alexander Bain (Peckhaus 2009, p.163). One might worry that by slighting the work of figures like Hegel, Peirce, and Mill on non-deductive inference these historical treatments of logic have unduly restricted the boundaries within which we imagine the possible conceptual positions one might occupy concerning such things as the relationship between formal and material inference. More recent work has broadened our conception of both non-Western logics and of the history of Western logic, and those so inclined to look will find a much better view of the historiographical terrain than was available 50 years ago (e.g. the four volumes of Dumitriu 1977, the *Handbook of the History of Logic* series begun with Gabbay and Woods 2004, currently at 11 volumes, and the papers collected in Haaparanta 2009).

But if we used to suffer from not having enough information ready at hand, there is now *so much* good work on the history of logic, and the details of individual views have been worked up to such a degree, that it can be difficult to know where to turn for one whose interests in contemporary philosophy draw her into conversation with the work of her forebears. But it may be well for analytic metaphysicians in particular to consider this material. Current debates about the nature of the metaphysical conditions marked by subtleties in the consequence relation and/or various modal operators sometimes sound echoes of this earlier work. Without claiming exhaustive coverage I will spend the next two sections focusing on two areas of research—one concerning the contrast between form and matter in logic, the other concerning a distinction between ex-



tensional and non-extensional dimensions of meaning—that provide some historical context for the perspective to be developed in the coming chapters.

#### 1.1.5 FORMAL AND MATERIAL CONSEQUENCE

As a first point of historical orientation for the material inferential modal expressivism I will be developing I want to consider some historically influential perspectives concerning formal and material consequence relations. More generally, I will be looking at a contrast between, on the one side, the form and matter of individual inferences, and on the other between formal and material inference as different sorts of premise/conclusion relations. Here we profit by consulting recent work by Catarina Dutilh Novaes (2011, 2012, Forthcoming). In a number of papers she has convincingly argued that the form/matter distinction that becomes of sometimes heated focus in medieval philosophy, on which every inference is composed of both a form and a matter, has its roots in a late-antiquity appropriation of Aristotle’s *metaphysical* distinction between form and matter for substances. Her (2012), building off work done by MacFarlane (2000), urges us to see the form/matter distinction in logic as the product of “a historical (contingent) course of events, and thus not necessarily constitutive of logic as a discipline” (p.398). Dutilh Novaes (Forthcoming) discusses her method in some detail. In light of various efforts at conceptual genealogy or conceptual archeology influenced by Nietzsche and Foucault (e.g. in the work of Edward Craig, Tim Crane, and Bernard Williams), she lays out an approach toward conceptual genealogy that plots a different way forward. While it is common to treat of genealogies as a way of either *vindicating* or *debunking* a particular view, she aims to be more neutral and to focus on genealogies as *explanatory*—they help us to understand why certain ideas came to prominence

without aiming to either justify or undercut those ideas. At the same time she recognizes that an account of the origin of a perspective may show that it is *historically contingent*, and in a case like this the genealogy may free us of the grip of a perspective that seemed forced upon us. As applied to the form/matter distinction she argues that the application of an originally *metaphysical* Aristotelean distinction (concerning substances) to *arguments* as the subject matters of logic, treating them as having form and matter analogously to the way individual objects do, is one that, in virtue of our appreciation of the contingency of this application, should lead us to be more cautious about uncritically accepting the thought that form and matter are a useful way of construing logical relations.

I do not wish to dispute Dutilh Novaes' genealogy for the form/matter distinction either in the details or in its results, as I think she makes a convincing case that one origin for the formal/material distinction in logic is found in a historically contingent appropriation from Aristotle's metaphysics and is not constitutive of logic as such. Nor do I wish to dispute her (or MacFarlane's) contention that "the quest for a principled partition of logical from nonlogical expressions is a misguided enterprise" (Novaes 2012, p.394).<sup>11</sup> Nevertheless, I would like to trace an alternative genealogy for a distinction that also deserves to be seen as a formal/material one, and I will argue that it has a right to be seen as well-founded. I will provide this complementary genealogy by contrasting her model of genealogy as one that is analogous to a tracing of lineages needed to settle questions of birthright (Forthcoming, §3.1), where the legitimacy of a claim to a title turns on exhibiting the right line of descent, with a view of genealogy on a biological model where the *relata* of descent are species rather than individuals and where legitimacy is not at is-

---

<sup>11</sup> In chapter 2, however, I will institute a distinction between formal and material consequence by adopting the resources of the sequent calculus.

sue.<sup>12</sup> With this alternative conceptual frame we are equipped with a different set of analogical resources to use when investigating a conceptual genealogy.<sup>13</sup> On this Darwinian way of thinking about conceptual genealogy it is entirely in order that some early trait would be appropriated by a variety of diverging lineages, that traits change over time, and that by these processes a descendant trait can be put to novel uses in successive generations (think of the origin of the workings of the mammalian inner ear in the gills that were the possession of our ancestors prior to their emergence from the primordial ocean). Here the metaphor is one of tracing the descent of earlier traits as they are modified to fit new uses in successive generations, some of which may branch away from others, rather than that of tracing the legitimacy of an individual's claim to a title. And this makes a discovery of multiple lines of descent each of which are fraught with historical contingency unproblematic. That the processes of speciation would result in traits that are different in kind from one another while sharing a common origin, and which are in each species the historically contingent effects of natural selection, does not in the least undercut their standing as traits with a vindicated claim to whatever standing we might expect them to have (in particular, to their claim to having a certain proper function in the contexts in which they exist). On this Darwinian view of conceptual genealogy the evident influence of historical contingency in the particulars of a given line of thought, and the presence of multiple descendants with incompatible positions, need not bar us from supposing that the positions in question (or at least some

---

<sup>12</sup> Though questions of the legitimacy of birth for individuals is the model she uses, Dutilh Novaes notes that conceptual genealogies focus on the development of concepts over time rather than the descent of a person. By beginning with a biological rather than social model, one whose domain is already focused on general terms over particulars, one might hope to build an analogy for understanding conceptual genealogy that was a better fit for what it was going to be used to model—namely, general terms or universals rather than particulars.

<sup>13</sup> I discuss the role of inference by analogy as a method of conceptual development, and apply the method to teleological explanations in biology before and after Darwin, in my (Forthcoming a).

of them) are *vindicated* by that genealogy, for they may be understood as proper adaptations to lived problems present in the contexts in which they developed.<sup>14</sup>

A Darwinian conceptual genealogy for (one version of) the form/matter distinction in logic can be supported by tracing a different line of descent for that distinction as it appears in medieval and post-medieval logical research. Here the explanatorily primitive distinction is not between the form and matter of arguments used to delimit what is logic properly so-called. Instead, we begin with the idea that there are two classes of *argument*, forms of reasoning, that can be roughly (as with any biological classification) demarcated into formal and material, and we look to the work of those who supposed that *both* forms of reasoning lie within the domain of logic. It is true that there has been a historical tendency to treat formal and material inference in terms of a distinction between form and matter drawn internally to individual inferences. But this is avowedly *not* the formal/material contrast of Hegel, Peirce, Sellars, or Brandom. And once we recognize that this latter distinction is an alternative not closed off by a genealogical story about the contingency of the former we can proceed to think about it as a genuine alternative.

At the center of this tradition (on my reconstruction) is a commitment to the explanatory centrality, in understanding why some sentence or subsentential content has the meaning it does when used at some context, of the rational relations (material as well as formal) that content stands in at that context. On this view one cannot suppose that an independent grasp of a sentence's representational relations will fix its meaning at that context without distorting our conception of what it is to be a bit of meaningful speech or thought. Here the form/matter distinction is not applied to subsentential vocabulary, separating logical from non-logical vocabulary,

---

<sup>14</sup> I hope it is clear that I am suggesting no great revision to Dutilh Novaes' view on conceptual genealogy. My aim here is to complement her approach by modifying it slightly, and I think there is much to be learned from her work.

so as to demarcate the form and matter of individual arguments (Dutilh Novaes 2012 pp.391-3), but rather one begins with a conception of *two different sorts of argument* (formal and material) and on that basis begins to think about the different roles that terms can play in underwriting their warrants. Rather than beginning from a form/matter distinction drawn at the level of subsentential content and then interpreting formal and material inferences on that basis, one begins with a view on which inferential context is explanatorily prior to subsentential content. I think this view is most forcefully articulated first, in different ways, by Hegel and Peirce. But early analogues are evident in the work of the medievals as well.

For centuries it was common to distinguish those consequences that were underwritten by formal rules and those that were material, the latter being dependent upon the terms occurring within them. From Pseudo-Scotus:

Consequences are divided thus: some are material, others are formal. A formal consequence is one which holds in all terms, given similar mutual arrangement and form of the terms....A material consequence is one which does not hold in all terms given similar mutual arrangement and form so that the only variation is in the terms themselves. (quoted in Bochenski 1961, pp.191-2; cf. the discussion of Pseudo-Scotus' account of formal and material consequences in Kneale and Kneale 1962 pp.278-81)

William of Ockham and Albert of Saxony also mark this distinction, and Buridan's theory of consequence is one of the more developed attempts to treat formal and material consequences separately. Material consequences were often treated as enthymemes reducible to formal consequences via the addition of a premise from which, together with the rest of the premises, the conclusion follows deductively (*vide* the debate between Sellars and Chisholm/Goodman on the subjunctive conditional). Pseudo-Scotus is one who held this view, and it appears in Ockham's ap-

appropriation of Abelard's conviction that a perfect argument is one that is good via structure alone, while an imperfect argument is made perfect with the addition of suppressed premises (cf. Kneale and Kneale 1962 pp.289-90). So far this account would suggest a genealogy consistent with Dutilh Novaes'.

There was no single treatment of formal and material consequence, however, and different figures held sometimes radically different views (Kneale and Kneale 1962 p.292-3 suggest that worries about semantic paradoxes led to this proliferation of standpoints). In the terminology of Ralph Strode, for instance, a formal consequence is one that holds because of a connection of *forms* grasped by the understanding—what would more properly be called a *material* connection by other figures. Though it never reached univocal acceptance, a version of the material/formal distinction concerning the consequence relation survived in Aldrich's 1691 publication of *Artis Logicae Compendium*, a book that was used for teaching logic until the middle of the 19<sup>th</sup> century (Kneale and Kneale 1962 p.298). The 18<sup>th</sup> century saw a number of figures defend a view of logic as material as well as formal. Now one begins to see the primacy of inferential context over subsentential content, for these figures argued that different domains of inquiry must be formalized according to facts peculiar to those domains. On this line of thought the material content of an inference cannot always be abstracted away from a context so as to arrive at the logical form of that inference. Instead, inferential contexts are essential for discriminating the contents of the terms occurring within particular sentences. Breaking with centuries of tradition Andreas Rüdiger argued that the perceived 'sterility' of syllogistic inference was owed to a failure to appreciate its character as *inventive*, as capable of arriving at unknown conclusions from given premises (Capozzi and Roncaglia 2009, pp.124-6). And though Christian Wolff thought of logic as univocal across all disciplines, Gottfried Ploucquet thought that logical calcu-

li should be developed according to the demands of specific domains of inquiry: “by nature and according to logical order every calculus comes after the understanding of the matter to which the calculus is applied....He who invents does not begin from a calculus, but from the consideration of things.” (quoted in Capozzi and Roncaglia 2009, p.135).

I think we should see the form/matter distinction, construed as one that distinguishes two different sorts of argument rather than a distinction that applies within arguments in order to demarcate their form and matter, as a distinction that tracks the difference between deductive and non-deductive inferences. For non-deductive inferences are *risky*, they take us to a conclusion that goes beyond what is contained in the premises. The material component of logic, then, is not simply something that must be abstracted away so as to arrive at the form as that in virtue of which an inference is good. Instead, some inferences are material in the sense that they are *not* underwritten by a schematic form but are rather good in virtue of the content occurring within them. And it is in the context of the history of these debates that we should see Hegel’s emphasis on the material character of logic, and not merely as a response to Kant’s formal characterization of (pure general) logic. Like many of the figures before him Hegel emphasized the need to treat logic in terms of material consequence relations in addition to merely formal ones. Only in this way, Hegel thought, could we understand the conceptual progress that is characteristic of protracted inquiry. This was of course in contrast with Kant, who famously held that pure general logic was formal and had been complete since the time of Aristotle. At the opening to The Subjective Logic of *The Science of Logic* Hegel writes (12:27, p.524):

This formal discipline must therefore be thought of as inherently much richer in determinations and content, and also of infinitely greater efficacy over the concrete, than it is normally taken to be.<sup>15</sup>

At the end of this section (12:28, p.525) Hegel explicitly contrasts his understanding of logic with both the Kantian and the Aristotelian:

Just as the Kantian philosophy did not consider the categories in and for themselves...still less did it subject to criticism the forms of the concepts that make up the content of ordinary logic....It is an infinite merit of Aristotle, one that must fill us with the highest admiration for the power of his genius, that he was the first to [provide a natural description of the phenomena of thought as they simply occur]. But it is necessary to go further and determine both the systematic connection of these forms and their value (*Wert der Formen*).

Hegel's response to Kant was not merely a rejection of logic as formal; it was a positive articulation (however imperfect) of an alternative position. Whereas it was common among modern philosophers to suppose that an immediate judgment arrived at without the drawing of an inference was a hallmark of philosophical certitude, Hegel thought that such immediacy was an artifact of our capacity to reason with the content of that judgment. And it was this *mediation* that was central to Hegel's theory of conceptual content:

...to regard the syllogism as merely consisting of *three judgments* is a formalistic view that ignores the relation of determinations which alone is at issue in the inference. It is altogether a merely subjective reflection that splits the connection of the terms into

---

<sup>15</sup> See also 12:19 (p.517).



isolated premises and a conclusion distinct from them...It is mostly because of this subjective attire that the inference appears as a subjective *expedient* in which reason or understanding take refuge when they are incapable of *immediate* cognition...This syllogistic inference from one separate proposition to another is nothing but a subjective form; the nature of the fact is that its various determinations are united in a unity of essence [*die Natur der Sache ist, dass die unterschiedenen Begriffs-bestimmungen der Sache in der wesentlichen Einheit vereinigt sind*]. This rationality is not an expedient; on the contrary, in contrast to the *immediacy* of the connection that still obtains in *judgment*, it [the syllogism] is the *objective* element; it is the prior immediacy of cognition that rather is mere subjectivity, in contrast to the syllogistic inference which is the truth of the judgment.<sup>16</sup> (*Science of Logic* 12:94-5, p.592-3)

Closer to our own time the logical investigations of Gottlob Frege and Charles Sanders Peirce each recognized a dimension of material connection between the antecedent and consequent of a conditional. For the purposes of formalizing a logical calculus, however, this dimension was often ignored. While in the *Begriffsschrift* Frege recognizes a causal connection (*ursächliche Verknüpfung*) implicit in the word ‘if’, such that an *assertion* of a conditional has its ground (*Grund*) in that connection, he emphasizes that his conceptual notation abstracts away from that connection and treats the conditional truth-functionally (1972, §5). For his part Peirce held that a conditional was a kind of rule for updating one’s belief state.

---

<sup>16</sup> At 12:57, p.554, in the opening discussion of the Judgment chapter Hegel characterizes the judgment as the “*true significance* of the previous forms of transition”—e.g., of the discussion of singular things, particularity and universality in the Concept chapter. That the judgment is the truth of the concept and the syllogism is the truth of the judgment show that inference is at the center of Hegel’s theory of conceptual content.

...the peculiarity of the hypothetical proposition is that it goes out beyond the actual state of things and declares what *would* happen were things other than they are or may be. The utility of this is that it puts us in possession of a rule, say that ‘if A is true, B is true’, such that should we hereafter learn something of which we are now ignorant, namely that A is true, then by virtue of this rule, we shall find that we know something else, namely, that B is true. (1885, pp.186-7)

This emphasis on the subjunctive marked an important shift in Peirce’s thinking. In his early work (e.g. p.132 of 1878’s “How to Make our Ideas Clear”) Peirce had supposed that an object that never *in fact* actualized some capacity was an object that could be said not to have the property in question—a diamond that somehow never underwent any interaction that elicited its hardness was a diamond that (we could suppose) was not hard. But toward the end of his career (such as it was) Peirce argued that the meaning of a sentence depended upon not just what consequences *do* follow from it but what *would* follow in other contexts. To put the point in the object-language, by contrast to his early view Peirce later came to think that it was the *subjunctive possibility* that an object could undergo some sort of interaction that made it the case that the object had the property in question even though it was never actualized. In one of a series of papers he wrote for *The Monist* in 1905 he explicitly repudiates his earlier view, writing (1905a p.354; emphasis in the original):

Indeed, it is the reality of some possibilities that pragmatism is most concerned to insist upon....For if the reader will turn to the original maxim of pragmatism at the beginning of this article, he will see that the question is, not what *did* happen, but whether it would have been well to engage in any line of conduct whose successful issue depended upon whether that diamond *would* resist an attempt to scratch it...

Peirce's later work is peppered with discussions about the importance of these "would-be"s for all sorts of things. It is also characteristic of Peirce's work that, like Hegel, he foregrounded inferential reasoning over judgments considered atomically. This commitment is evident in Peirce early on. At the start of his 1869 paper "Grounds of the Validity of the Laws of Logic" he summarizes part of the argument made in "Some Consequences of Four Incapacities" (1868) by saying that "every judgment results from inference" (he makes the assertion as the antecedent of a conditional, but he is clear that in the 1868 paper he's argued for that antecedent).

Just as Hegel's contributions to logic should be understood in the context of this intellectual genealogy in the history of logic rather than as a crude response to Kant's merely formal conception of (pure general) logic, Sellars' argument in "Inference and Meaning" should likewise be understood in this context and not as a crude response to Carnap's program in semantics and natural science. The idea that the subjunctive conditional gives object-language expression to material rules of inference, and that "[m]aterial rules are as *essential to meaning* [Sellars' emphasis] (and hence to language and thought) as formal rules, contributing the architectural detail of its structure within the flying buttresses of logical form", (1953, p.7) are ideas that have animated inquiry into the nature of logic for centuries.

I will return to a consideration of Hegel and Peirce on the relationship between inference and the subsentential content of judgments in section **1.1.7**, as their treatment of non-deductive syllogistic figures offers a line of descent for the form/matter distinction in logic, and so my appropriation of a Sellarsian interest in material inferences, that *does* have its roots in Aristotle's conception of logic and which for this reason is not the result of an illicit transposition into logic of his form/matter distinction in metaphysics (even though Hegel and Peirce adapt Aristotle's

conception of the syllogism to concerns of their own).<sup>17</sup> Given the influence that Hegel and Peirce had on Sellars' views, this will ensure that the form/matter distinction I make use of in developing a material inferential interpretation of the subjunctive conditional in chapter 2 will likewise share the pedigree of the Darwinian conceptual genealogy introduced in this section. Before doing so I will fill in that genealogy with a little more detail by discussing the late medieval and modern distinction between the extension of a term and its comprehension, and the relationship between this distinction and contemporary views on modality.

#### 1.1.6 EXTENSION AND COMPREHENSION

As noted above, since the 1970's philosophical discussion of the subjunctive conditional has tended to divide the theories into two camps—the metalinguistic approach, typified by work from Nelson Goodman (1983) and Roderick Chisholm (1946), and the possible worlds approach, building on Kripke's semantics and originating in work from Robert Stalnaker (1968) and David Lewis (1973). The possible worlds approach toward subjunctive conditionals has been well worked-out since the early debates of the 1970's. The metalinguistic approach, by contrast, has seen little discussion since the advent of possible worlds analyses.<sup>18</sup> And while the Humean project that motivated Carnap and the Vienna Circle's response to neo-Kantianism is sometimes pointed to as an important precursor to later treatments of modality, on the whole the details of

---

<sup>17</sup> **N.B.** In this document citations of the form **X.Y.Z** denote chapter X, part Y, section Z of the current work.

<sup>18</sup> Kvart (1986 pp.53-8) and Pollock (1976 p.141) each show their respective systems are ones on which possible worlds and metalinguistic analyses are equivalent, however.

this project do not enter into contemporary discussions.<sup>19</sup> For this reason the opening paragraphs to Wesley Salmon's Foreword to the 1976 reprinting of Reichenbach's 1954 book on modality are all the more disheartening:

There is a close-knit complex of philosophical problems which has been with us since antiquity. These problems involve such concepts as potentiality and disposition; necessity, actuality, and possibility; and even material and subjunctive implication. They are philosophically ubiquitous, cropping up in a range of fields broad enough to include metaphysics, epistemology, philosophy of science, logic, philosophy of language, and ethics. They seem, moreover, to be strangely recalcitrant. It is to this set of perennial philosophical problems that Hans Reichenbach's monograph—originally published in 1954 under the title *Nomological Statements and Admissible Operations*, but here retitled *Laws, Modalities, and Counterfactuals*—is addressed. The new title will, it is hoped, provide the philosophical community with a clearer idea of the subject matter of the book.

... Reichenbach's monograph attracted little attention when it was first published, and it is almost completely ignored today. This lack of attention is not due to any demonstrated inadequacy in his results. Only a few philosophers seem to have been aware

---

<sup>19</sup> Tracing the Kantian and neo-Kantian roots of this strand of the story, and contrasting them with the Humean influences that have reigned in various philosophical discussions over the last century, would provide a further level of detail to this discussion. Cf. Sellars (1958 §79, emphasis in the original):

[O]nce the tautology 'The world is described by descriptive concepts' is freed from the idea that the business of all non-logical concepts is to describe, the way is clear to an *ungrudging* recognition that many expressions which empiricists have relegated to second-class citizenship in discourse are not *inferior*, just *different*.

of the existence of this monograph, or what it is about, and those who were cognizant of it may have been repelled by its admitted complexity. Its republication is designed to bring it to the attention of philosophers who are concerned with this set of problems. (p.vii)

Despite Salmon's hopes, Reichenbach's work would remain largely neglected. This is all the more striking when one notes that the reprinting Salmon oversaw occurred just three years after Lewis' *Counterfactuals*, six years after Kripke's "Naming and Necessity" lectures, eight years after Stalnaker's "Conditionals", and in the same year as Pollock's *Subjunctive Reasoning* was published—square in the middle of the decade in which the metaphysical foundations of possible worlds semantics were laid.

Both the Chisholm/Goodman/Reichenbach and the Lewis/Stalnaker approaches are committed to a truth-conditional exposition of counterfactuals. According to the metalinguistic approach, a counterfactual is true just in case the antecedent, together with some set of propositions *S*, logically entails the consequent. The aim then is to delineate the criteria for membership in *S* (Reichenbach (1976) is well worked-out in this regard). The possible worlds approach has it that a counterfactual is true just in case the consequent is true at worlds where the antecedent is true that are most similar to the actual. Both of these approaches take for granted that the truth of a counterfactual is something that is owed an analysis, and each suffers a corresponding burden of explanation. On the metalinguistic side it has been difficult to find a sufficiently general set of conditions that, together with the antecedent of a subjunctive, entail its consequent, without those conditions being vacuous or mischaracterizing a range of important cases. On the possible

worlds approach the notion of similar world(s) must be relied on in order to evaluate the truth of a subjunctive.

But the foregoing discussion gives us the resources to see Sellars' material inferential interpretation of the subjunctive conditional as a contrast to *both* the Chisholm/Goodman/Reichenbach *and* the Lewis/Stalnaker approaches toward modality. More generally, I think we can see Sellars' interest in material inferences as an interest that is to be situated within the context of concerns with a genuine alternative to extensional treatments of modal notions. One of C.I. Lewis' motivations in working out a theory of strict implication was that the resulting connective would avoid some of the paradoxes of material implication, and for that reason be a better candidate for understanding what 'if' means in natural language. Concerns in this period with a theory of relevant implication were directed at similar ends (e.g. Anderson and Belnap 1975 and Anderson, Belnap, and Dunn 1992). Reichenbach distinguishes two ways of reading the logical operators—one on which they are 'adjunctive', where their interpretation is exhausted by their truth-tables, and one on which they are 'connective', meaning that their interpretation turns on a non-logical connection between the contents they operate on. While Reichenbach admits that connective readings of the logical operators have to be posited if we are to make sense of some of what we habitually say, like Frege in the *Begriffsschrift* he aims to give a treatment of logical operators that dispenses with their connective readings. His account of modality proceeds by building a metalanguage for modal notions in terms of complex universal generalizations. In this Reichenbach is to be grouped with Chisholm and Goodman—all three figures aim to give a reductive definition specifying when a subjunctive conditional is true in terms that are resolutely extensional. Sellars' metalinguistic theory of the subjunctive conditional is of a dif-

ferent sort of order—his aim is to understand the subjunctive as the expression of a material inference.

As modal logic developed in the last few decades of the 20<sup>th</sup> century the material inferential explication of modal notions was mostly ignored (Robert Brandom is, of course, the big exception). But a contrast between connective and formal readings of the conditional goes back into the middle ages, as does an interest in reading the conditional as an expression of a consequence relation. While Philo of Megara held that the conditional was the truth-tabular material horseshoe, Diodorus argued for a modal connection on which a conditional is true just in case the negation of the consequent is incompatible with the antecedent. Bochenski notes that this definition, sometimes attributed to Chrysippus, may be likened to Lewis' strict implication (Bochenski 1961 p.119). Boethius and Abelard each thought that the truth of a conditional was a function of a necessary connection between the antecedent and consequent, and for Abelard these connections were identified with the laws of nature in such a way that the impossibility of the truth of the antecedent together with the falsity of the consequent was insufficient for the truth of the conditional; there must be some connection between the antecedent and consequent (Knuuttila 1993 pp.95-6). The consequence relation was also frequently treated modally, and it was common for philosophers in the middle ages to treat the consequence relation in terms of conditionals (Kneale and Kneale 1962 pp.274-9 and 286ff; Walter Burley was an exception).<sup>20</sup> Jan Łukasiewicz's *Aristotle's Syllogistic from the Standpoint of Modern Formal Logic* initiated a 20<sup>th</sup> century debate concerning whether the valid syllogistic moods are conditionals or rules of inference, but this question goes back for centuries (Aristotle himself used conditional sentences

---

<sup>20</sup> See pp.190ff. of Bochenski (1961).



in the *Prior Analytics* to express the different syllogistic moods, though Boethius thought of them as inference schemata).<sup>21</sup>

These various interests in connective or relevance readings of logic can be thought of as descendants of a notion of *comprehension* as a proper contrast with *extensional* treatments of language and thought. Prior to the rise of mathematical logic in the second half of the 19<sup>th</sup> century, and going back into the middle ages, questions of meaning were almost universally addressed by way of two notions—extension and intension or comprehension. One sees shades of this idea as far back as the late medieval distinction between supposition and signification, itself introduced to make sense of apparent shifts in truth-value induced by substitution of co-referential terms in modal contexts. Later views do not easily correspond to medieval theories of supposition and signification, but the discussion of ‘*étendue*’ and ‘*compréhension*’ in *The Art of Thinking* (the logic text that Antoine Arnauld and Pierre Nicole oversaw the publication of at Port-Royal in 1662) would offer something like a canonical characterization of the distinction for generations. It makes a showing as ‘*Extension*’ and ‘*Inhalt*’ in Kant’s logic, in De Morgan’s work as ‘scope’ and ‘force’, in Sir William Hamilton’s lectures on logic and in Peirce’s early logic as ‘breadth’ and ‘depth’, in Mill’s logic as ‘connotation’ and ‘denotation’, and it was enshrined in 20<sup>th</sup> century philosophy of language with Frege’s ‘*Sinn*’ and ‘*Bedeutung*’.

To my knowledge no systematic treatment of the history of this distinction has been given, and nearly every figure who employs the distinction marks it at least slightly differently. But as a first approximation the difference is that between the objects that a term refers to and the implications a term has in its uses, where those implications are underwritten by the term’s

---

<sup>21</sup> Kneale and Kneale 1962 p.193 note that Boethius uses *consequentia* both for the relation between premises and conclusions and for the relation between antecedents and consequents, however, and they suggest a Stoic origin for this usage.

meaning. The point of distinguishing a dimension of content like comprehension (to pick a label) is to be able to mark differences in semantic role that do not show up as constructions out of referents or truth conditions. Though there were a few efforts from the 17<sup>th</sup> through the middle of the 19<sup>th</sup> century to formalize syllogistic inference and a theory of judgment in terms of a concept-containment relation that bears some relation to the notion of comprehension, and though some of the figures working on later programs in the algebra of logic used a non-extensional theory of meaning, the research developing out of the middle of the 19<sup>th</sup> century converged around formalisms that were analogous to (sometimes generalizations of) extensional mathematical formalisms (see the discussions at §§8-10 of Capozzi and Roncaglia 2009 and §§2-3 of Peckhaus 2009).

That period is also marked by debates concerning the extent to which logic must be conceived as *contentful*, so that particular domains will have their own logics as determined by material facts about each domain of inquiry, or whether logic was rather the most general form of reasoning and so was indifferent to the content of particular sciences. With the development of set theory and the work that was done in the foundations of arithmetic the 20<sup>th</sup> century dawned with a preponderance of the work in logic and philosophy devoted to extensional metalinguistic resources and a view of logic that was content-neutral. This is not to deny that the distinction between extension and comprehension was salient for those working in this area, nor is it to say that there was no survival of the thought that some inferences were grounded in material or relevance conditions. The point is only that the attempt to *formalize* a comprehensional theory of meaning has been mostly neglected from roughly the end of the 19<sup>th</sup> century (in addition to the relevance logicians one should mention the work downstream from figures like Alonzo Church and Josiah Royce on theories of sense and reference).

It is true that Frege's and Russell's discussion of opaque contexts were sometimes undertaken with the term 'intensional contexts', and that with the successful application of possible worlds semantics to these intensional contexts it is not uncommon to hear formal systems with Kripkean model-theories referred to as 'intensional logics'. While there is a long history to the idea that alternative possible states of the world offer a means of accounting for the truth conditions of statements of necessity and possibility (and so a means of accounting for what those statements represent), the representational commitments of this conception of modality were historically kept distinct from the comprehensional side of language. But in the second half of the 20<sup>th</sup> century Kripke's set-theoretic formalization of possible worlds as points of evaluation for statements of necessity and possibility led to the widespread application of that approach toward a variety of intensional contexts. Soon it became common to hear philosophers talk about the intension of a term as a function from a world to an extension—as if all that mattered for differentiating the proper use of 'renate' and 'chordate' was the ability to discriminate or sort the bearers of those terms in every possible context. Of course such a discriminatory capacity is a necessary condition for grasping the meaning of world-denoting term like 'renate'—if one cannot sort things into categories of 'renate' and 'not rene' one doesn't understand what the term means. But discrimination is hardly sufficient for grasp of meaning, and if one cannot specify *that in virtue of which* the sorting is warranted one lacks a full grasp of the term. To be cognitively on to renates one must not only be able to sort the members of the kind; one must also be able to specify that which makes for a rene and that which does not.<sup>22</sup>

---

<sup>22</sup> In the language of modern philosophers this contrast marks that between the possession of a clear and *confused* idea, grasp of which permits its bearer to sort the objects that fall under it without being able to specify the marks that underwrite the sorting, and a clear and *distinct* idea, grasp of which affords both the capacity to sort and the capacity to explain why that sorting is proper.

Despite the successes of possible worlds semantics in modelling the content of extensionally problematic vocabulary, that semantics remains extensional through and through. With the set-theoretic resources of a single point of evaluation generalized ‘up’ a level in the type hierarchy of extensions one can discriminate more fine-grained dimensions of meaning, but the resources of this additional discriminatory power remain extensional: instead of *one* set of extensions as the basis on which to model the language, the possible worlds semanticist helps herself to a *set* of sets of extensions, with the result that a modal sentence is not a representation of the way *one world* is but instead is a representation of the space of possibility *across* worlds. While this move gains set-theoretic precision for many of the contexts in which problems of intensionality arise, one should not suppose that extensions across possible worlds are proper inheritors for what used to be called ‘intension’, ‘comprehension’, or ‘connotation’. For the people who historically worried about ‘intension’ or ‘comprehension’ as a term to contrast with ‘extension’, the suggestion that extensions across possible worlds suffice to explain the former would be met with suspicion. Though ‘possible worlds semantics’ and ‘intensional semantics’ may be co-extensional today given certain views common in logic, they are not in any useful sense co-intensional.

In making this point I am not merely objecting to a historical narrow-sightedness in the way 20<sup>th</sup> century philosophical approaches toward modality developed, or quibbling over how we ought to use the term ‘intension’.<sup>23</sup> Informed steps were made toward developing a logic

---

<sup>23</sup> For which latter issue see Geach’s acerbic discussion at p. 181 of his (1980):

I have here deliberately chosen the spelling "intentional"; in recent writing the spelling of this word, and of the corresponding adverb in "--ally" and abstract noun in "--ality", oscillates irregularly between a form with "--tion" and one with "--sion", and in fact Carnap prefers the latter spelling. But in this use the adjective goes back to medieval Latin; and for medievals the intentio of a term was what was intended by the mind in the use of the term, *quod anima intendit*. The old spelling persists in the expressions "first intention" and "second intention".

along lines that diverge from the extensional and representational approaches that were developed during the middle of the 19<sup>th</sup> century, but because these steps were insufficiently attended to by subsequent philosophers and logicians a promising line of intellectual research has been left moribund. That this is so is suggested by some reflections on the views that Hegel and Peirce came to with regard to the structure of syllogistic inference. Unlike the Aristotelian division of the syllogism into exclusively deductive figures, a division that dominated discussions of syllogistic inference for nearly two millennia, Hegel and Peirce both reorganized the structure of syllogistic inference to derive inductive and hypothetical figures as well as deductive ones.<sup>24</sup> In my (2014) I show that if one regiments Hegel's discussion of individuals, particulars, and universals in terms of singular terms, kind terms, and predicates, and takes Peirce's (1867) distinction between the informed and substantial extension and comprehension of a concept, then one can show that the employment of the three syllogistic figures suffices to increase the informed extension and comprehension of singular terms, kind terms, and predicates in clear and systematic ways according to the way those terms occur as middle terms in (respectively) inductive, deductive, and hypothetical inferences. It happens, for instance, that when one uses a singular term to mediate an inductive inference linking a kind term to a predicate one thereby, in virtue of accepting this inference, expresses commitment to an increase in the comprehension of the kind term by the addition of the predicate in question and the increase of the extension of the predicate by all of the members of the kind:

---

Sir William Hamilton had a muddled idea that terms had an associated intensive magnitude, greater according as they expressed more concurrent attributes, and to bring this out he introduced an English form of the Scholastic term for intensity, "intensio"; from his day onward, "intension" and its compounds have tended to oust "intention" and its compounds; the spelling of "extension" has no doubt furthered this process. Recent interest in Brentano's doctrine of intentionality has however led to a revival of the old "--tion" spelling.

<sup>24</sup> Following Redding (2003), my (Forthcoming a) and (Forthcoming c) look at this reorganization in more detail.

This rod is made of copper.

This rod conducts electricity.

Therefore, all copper things conduct electricity.

Having accepted this inference (perhaps via an induction over cases), one now implicates that predicate of any individual classified under the kind term (it is deductive inference, with a kind term as the middle term, that makes these implications explicit). This non-deductive form of reasoning is one that results in changes in the extension and comprehension (the latter understood as conceptual implications) of the terms of a language that are underwritten by discovered facts about the objects denoted by those terms. But this suggests that the notion of comprehension, as a dimension of meaning to be contrasted with extensional reference, is naturally associated with non-deductive forms of reasoning. And this gives us a different way of thinking about the formal/material distinction as it appears at various points in the history of logic.

#### 1.1.7 A DARWINIAN CONCEPTUAL GENEALOGY FOR MATERIAL AND FORMAL CONSEQUENCE RELATIONS

On the line of thought I have been drawing together some forms of reasoning are not deductively valid while still falling, *qua* forms of reasoning, within the purview of logic. And this offers us a way of complementing Dutilh Novaes' conceptual genealogy for the form/matter distinction in logic with an alternative one. For in tracing the line of thought in the preceding sections I have not relied on a form/matter distinction that applies within a single argument so as to distinguish the form of the argument from its matter. Rather, I have used a (somewhat neglected) period of history in the development of logic that distinguishes formal and material consequences as dis-

tinct forms of reasoning. And when the formal/material distinction in logic is understood in the first instance as a distinction concerning deductive and non-deductive inferences rather than as different facets of a single inference, then there is the possibility of seeing this distinction as one that, *pace* Dutilh Novaes, does in fact occur in Aristotle's logic and so is not a later application to logic of an originally metaphysical distinction.

In coming to his mature views of logic Peirce loosens his conception of inference as syllogistic, trades talk of 'hypothesis' for 'abduction' or 'retroduction', and associates induction and abduction with the processes of reasoning Aristotle names '*epagoge*' and '*apagoge*' respectively (cf. the discussion in sections 1 and 2 of Levi 2012). In point of historical fact Aristotle's few remarks about *apagoge* came to be developed by later commentators as a theory of indirect proof or proof by contradiction, and there is little to recommend the view that Aristotle had a view of *apagoge* that was much like Peirce's view of abduction.<sup>25</sup> But if we adopt a Darwinian understanding of conceptual genealogy, where the metaphor is one of earlier members of a lineage giving rise to successive generations that may incorporate radically transformed traits or sets of traits across multiple lines of descent rather than a metaphor of tracing the legitimacy of a claim to a particular birthright, then the variations among Aristotle's discussion of *epagoge* and *apagoge*, Hegel's discussion of second and third figure syllogistic inference, and Peirce's discussion of

---

<sup>25</sup> The discussion of the 16<sup>th</sup> century Italian philosopher Jacopo Zabarella at pp.306-7 of Kneale and Kneale might give Peirce some support, however. Like Peirce Zabarella distinguishes deductive (compositive) from non-deductive (resolutive) forms of reasoning, and like Peirce Zabarella traces this distinction to Aristotle. Additionally, he supposes that the resolutive form of reasoning has two species, one of which is induction and the other of which involves reasoning from effects to causes, where the latter can result in knowledge of something new while the former only confirms what is implicitly known in the cases. Kneale and Kneale are unimpressed with Zabarella's work, however, writing that "it can hardly be sad that he has indicated a new programme for scientific advance", though they qualify this remark with the claim that "his terminology seems to have inspired Galileo's procedure in the analysis of mechanical problems, and for this reason it deserves to be remembered" (ibid p.207). One might expect that a philosopher within the tradition I am sketching could hope for no greater reward than that one's view was influential in shaping the scientific understanding of a figure such as Galileo.

induction and abduction will not be regarded as undercutting the legitimacy of these later views. For this exercise shows that there is a genealogy for the form/matter distinction in logic that applies that distinction directly to the classification of inferences rather than deriving it from a distinction drawn from Aristotle's metaphysics. Aristotle himself recognizes that deductive syllogistic inference does not exhaust logic, and he himself marks a distinction between formal and material inferences construed as deductive and non-deductive inference. And Sellars' understanding of the subjunctive conditional as an object-language transposition of a material rule of inference can be understood as a move that foregrounds non-deductive reasoning. For the subjunctive conditional does not obey antecedent strengthening (from 'if the match were struck, it would light' one cannot infer 'if the match were wet and struck, it would light'), and this fact about the subjunctive conditional is reflected in the fact that a material inference is non-monotonic—the truth of the premises do not guarantee the truth of the conclusion, for the addition of new premises can affirm a material inference (I will have more to say about this in chapter 2). While a material inference is a good inference, its goodness can be revoked; and to specify the conditions under which a material inference is good or bad is to specify something about the kinds of thing (facts, objects, properties, etc.) under consideration in that inference. Locating the Sellarsian view to be developed in the coming chapters within this Darwinian genealogy for the set of ideas I will be employing thus serves to explain the origin of those ideas not in the confused and historically contingent conflation of a metaphysical point about form and matter in substances with a point about the structure of arguments, but in a recognition that deductive and non-deductive inference call for different sorts of treatment. Finally, it is worth pointing out that something like this distinction remains an ongoing topic of philosophical research, both in the work of figures influenced by Hegel, Peirce, and Sellars, and also in the philosophy of science.



While there have been many attempts to formalize non-deductive forms of inference, in a handful of recent and forthcoming publications John Norton has argued for what he calls a *material* theory for both induction and inference by analogy (2003, 2011, 2014, Manuscript)—analogical reasoning being what Hegel associates with the third syllogistic figure (hypothesis or abduction in Peirce).<sup>26</sup> On Norton’s view there are no formal rules that specify which inductive and analogical inferences are good; instead, Norton argues, particular instances of these inferences are justified by material facts concerning the specific subject matters to which they are applied.

#### 1.1.8 AN ABDUCTIVE INFERENCE FROM MODAL EXPRESSIVISM TO A DESCRIPTIVE METAPHYSICS OF KINDS

By itself this genealogy does not establish that there is anything like a complete or coherent view in the works. But the current project can be read as an indirect argument toward this establishment, with the aim of showing the sorts of metaphysical conclusions to be underwritten by the view that results. The overall structure of this argument can be thought of in terms of Peirce’s mature view on the relationship between deduction, induction, and abduction. Peirce came to believe that the process of inquiry has three stages corresponding to the use of these three forms of reasoning. One begins with an abductive inference that would explain some datum by expanding our knowledge of it and, on the supposition that the abductively inferred conclusion is true, one proceeds to draw deductive consequences implied by that hypothesis. The researcher then investigates whether these consequences hold with the result that, if they do, she draws an

---

<sup>26</sup> Norton is also working on a treatment of inference to the best explanation, long associated with abduction, in his material theory of inference (personal correspondence).

induction over the results to the conclusion that the abduction is warranted (cf. Peirce 1901, especially pp.94-7, and Levi 2012 pp.76-7). Transposed into the current project the abductive inference that begins this inquiry is that a material inferential modal expressivism, of the sort outlined here and developed in the chapters to follow, can be used to explain some of our most primitive metaphysical commitments, thereby rendering them intelligible as the commitments they are. It would follow from the truth of this claim that a variety of representational commitments are implicated by the use of different modalities in judgments of different kinds of object (these commitments will be discussed throughout the second half of the dissertation and summarized at the start of the Conclusion). To vindicate that abductive inference, then, we would expect to see these representational commitments made intelligible by this hypothesized expressivism, and at the end of the dissertation I will argue that the successes arrived at in exhibiting the representational commitments implicit in different modal judgments interpreted by a metalanguage of material inferential relations supports the hypothesis that a material inferential modal expressivism offers a way of explaining some of our most basic metaphysical commitments concerning different kinds of individual.

To forecast one issue that will recur throughout the first half of the dissertation, I will argue by way of an interpretation of so-called ‘reduplicative’ expressions (e.g. ‘*qua*’, ‘insofar as’, ‘in virtue of being’, ‘in virtue of the fact that’, etc.), a topic of interest in medieval philosophy as it grew out of commentary on Aristotle’s metaphysics, that a variety of what have recently been called ‘grounding explanations’ can be understood as means of giving object-language expression to specific sorts of structure in the inferential relations that different sentences and terms stand in, and that this role can be understood without having to posit any sort of metaphysical

baggage beyond what the sciences tell us about particular kinds and their properties.<sup>27</sup> Roughly, to say something like ‘the cup, *qua* glass, would break if dropped’ or ‘the match, in virtue of being what it is, would light if struck’ is to give expression to a context sensitive rule of inference that is associated with some linguistic item (a kind term, a predicate, a sentence, etc.). Under the view developed in chapters 2 and 3 it will be shown, in chapter 4, that one role of these locutions is to classify an object that has been referred to, thereby interlocking the implicational dimension of language with the referential, comprehension with extension. While naming an object picks it out as a subject of conversation, we must classify it if we are to know what to say about it. By having a device that lets us interpose classification under a kind between the attribution of a property and reference to a particular one is thereby able to explain some relevant connection between the particular and the property, a connection that holds in virtue of facts concerning the kinds and properties invoked by that classification. And having made that connection we are prepared to reason with these terms in other contexts. But in making such a classification with the employment of these grounding explanations we need not suppose that we are representing the world in any way other than that which is involved in ordinary representations about whatever objects, properties, and facts are under consideration—in the language introduced in the first section of this Introduction, they play a *purely pragmatic* role. These reduplicative object-language expressions, and the material inferential structure they give expression to, will be introduced into a language governed by a material consequence relation in chapter 2 (2.2.5 and 2.2.6), they will be used to specify different ontic modal forces (e.g. nomological and logical) in 3.1.2,

---

<sup>27</sup> It is a historical oddity that the grammatical category of ‘reduplication’, which properly refers only to phrases where one and the same term is duplicated (e.g., ‘Socrates, *qua* Socrates’) came to be broadened by scholastic philosophers to include any sort of reference back to an individual even when that reference involves a classification that is not itself mentioned by the first referential term.

and they will prove crucial for chapter 4's treatment of the comprehension of kind terms (4.1.2 and 4.1.3) as a function of more fine-grained classifications of the material rules of inference introduced and discussed in chapters 2 and 3. In this way a range of grounding explanations, recently a topic of analytic metaphysical research, are shown to hearken back to earlier work in the history of philosophy whose relevance is worth noting and which are capable of being given an expressivist interpretation.

Though I will occasionally offer a short discussion that connects the work to follow with its historiographic background, I will not make that historiography a point of orientation going forward. Instead the rest of the project focuses on developing a material inferential interpretation of the subjunctive conditional, of kind terms, and of various modalities (in chapters 2-4) and applying these resources to the development of a descriptive metaphysics for chemicals, organisms, and persons (in chapters 5-7). For by distinguishing what is *said* or represented with modalized sentences from what is *done* or expressed in using them I will show that some of our most primitive metaphysical commitments, as commitments concerning how we represent different kinds of object, can be read off the practices of reasoning that are associated with the use of different modal operators and kind terms. This is a project in descriptive metaphysics in that it aims to articulate the metaphysical commitments we take up simply in virtue of how we reason about the world. I will show that it is possible to delineate very general metaphysical commitments concerning different kinds of object by looking to the rules of inference that govern the use of different kinds of modal vocabularies. As a simple case, to say that some object *necessarily* has a property is to commit oneself to the claim that it does, and if that object proves not to bear that property one must retract the claim. One will have made an error if one has said of something that did not happen that it was necessary. But to say that an object *ought* to bear a property is not

to take up the corresponding commitment, and when an object is not as it ought to be this is because it is *itself defective* in some way. This means that organisms and persons, as individuals that we reason about under the normative modalities, can be excellent and defective in ways that are categorially out of place for those objects that fall only under the ontic modalities. These metaphysical commitments are reflected in the fact that the ontic modalities obey the T schema (from ‘necessarily  $\phi$ ’ one can infer ‘ $\phi$ ’) while that inference is not underwritten by the use of normative modality.

The linchpin to this descriptive metaphysics of kinds will be the interpretation of the subjunctive conditional in terms of material inferential relations, the interpretation of various modal operators in terms of sets of subjunctive conditionals, and the justification of different modalized assertions in terms of classes of kind terms. For after the material inferential interpretation of the subjunctive conditional is in place, then by interpreting a variety of modal operators via sets of subjunctive conditionals it is possible to read object-language claims about the way the world must and might, ought and may be as devices for covertly giving expression to the rules of inference that govern the language. Because members of different classes of kind term are used to justify assertions made under different modalities, metaphysical commitments concerning what it is to be a member of a given kind can be read off the rules of inference for the corresponding modalities. When modal operators are interpreted in terms of subjunctive conditionals, and these as means of expressing the rules of inference that govern the terms of a language, it follows that to spell out the rational relations that hold among modal assertions and different classes of kind terms will at the same time be to spell out the metaphysical commitments we take up simply in virtue of how we reason about different kinds of individual. This order of explanation furnishes a view on which metaphysical commitments regarding what it is to be a chemical, an organism,

and a person can be read off our practices of reasoning. Object-language claims concerning *what it means to be* (e.g.) an excellent or defective organism or person are thereby understood in terms of metalinguistic commitments concerning *what it means to reason* about organisms and persons in the ways that we do.

## 2.0 A MATERIAL INFERENTIAL INTERPRETATION OF THE SUBJUNCTIVE CONDITIONAL

*Consequences are divided thus: some are material, others are formal. A formal consequence is one which holds in all terms, given similar mutual arrangement and form of the terms....A material consequence is one which does not hold in all terms given similar mutual arrangement and form, so that the only variation is in the terms themselves.*

Pseudo-Scotus, Commentary on Aristotle's *Prior Analytics*

*Material rules are as essential to meaning (and hence to language and thought) as formal rules, contributing the architectural detail of its structure within the flying buttresses of logical form.*

Wilfrid Sellars, "Inference and Meaning"

This chapter spells out and defends the explanatory framework that will be developed in subsequent chapters. Part 1 outlines a class of consequence relations with both monotonic formal and non-monotonic material fragments; whereas a formal monotonic inference from some set of premises to a conclusion will remain a good inference with the addition of more premises, a material inference means that it can be defeated with the addition of new premises. In the course of discussing a class of formal monotonic and material non-monotonic consequence relations, I discuss two problems with laying down the material rules of inference necessary for specifying in-

stances of such combined consequence relations. Solving these problems will count as satisfying the criteria of adequacy for the resources drawn together in this chapter, for the resolution to each problem supplies a method for constructing a consequence relation of the sort considered here. The first is the problem of determining, for any given context, what material inferences are good and what not (2.1.2). As the construction of such a language depends upon sorting the good inferences from the bad, the marks by which this sorting is brought off must be specified; otherwise, the ability to sort is at best implicit in practice. I will refer to this as the *problem of effability*. The second problem to be addressed in the construction of the languages under consideration here is the problem of selecting those consequences that are underwritten by particular sentences (2.1.3). For a material inference is one that holds because (in some sense) of the contents of particular sentences; not every inference that is warranted at a context is warranted by a conception of what it means to be some kind of thing. And this means that, in addition to the more general problem of finding criteria by which to determine which material inferences are good and which bad, we must have some account of which particular sentences underwrite any given inference. I will call this the *problem of comprehension*.

The main result of part 2 is that the subjunctive conditional can be understood to give object-language expression to a corresponding rule of inference, so that the assertion of a subjunctive has the function of communicating to an auditor that an inference is good (2.2.1). In 2.2.2 I consider an objection to this approach and use a response analogous to one that Lewis gave so as to shed light on a comparison between model-theoretic representational and proof-theoretic expressive accounts toward the subjunctive conditional. Crucially, however, this view allows that the assertion of a subjunctive conditional can also be understood as a claim that purports to represent the world (2.2.3). For this reason, the problem of determining which material inferences



are good for a given consequence relation (the problem of effability) can be decided, in practice, by attending to the use of the subjunctive conditional (2.2.4). In appendices I show how to use this approach to interpret arbitrarily right and left nested subjunctives (appendix A), and I give a condition under which an Import/Export principle holds for the subjunctive conditional in the object-language in terms of a corresponding updating function for premise sets in the metalanguage (appendices B and C). The problem of comprehension is addressed by arguing that a variety of two-place intensional operators, habitually used to denote explanatory relations (e.g. ‘in virtue of’, ‘and for this reason’, and ‘because’), can be understood as object-language devices for marking the material inferential relevance of certain sentences in drawing certain inferences (2.2.5-6). And so the discussion of part 2 shows how to use pre-existing practices of explanation, as found in the use of various intensional vocabularies, to individuate the material consequence relation introduced in part 1. Finally, because the object-language use of these vocabularies is also understood to represent the world in certain ways, the descriptive project of specifying a consequence relation for a given speaker or community by attending to these habitual practices of explanation is at once a project of constructing a material inferential frame of the sort considered below and a project in descriptive metaphysics. Sections 2.2.7 and 2.2.8 offer some concluding remarks on the contrast between model theory and proof theory, and on the uses to which the approach toward logic and metaphysics developed here will be used in the chapters to follow.

## 2.1 A NON-MONOTONIC MATERIAL CONSEQUENCE RELATION<sup>28</sup>

### 2.1.1 OBJECT-LANGUAGE, PROOF-LANGUAGE, AND METALANGUAGE

I will frame the view with some terminological notation marking off object-language sentences from proof-theoretic and model-theoretic metalanguages, thereby distinguishing representational from expressivist interpretations of object-language claims. Whereas on a model-theoretic approach toward language the derivations licensed by the rules governing a consequence relation are commonly underwritten by rules for truth-preservation, in proof theory the logical operators of an interpreted language are understood in terms of the rules that govern their uses in these derivations—that is, by introduction and elimination rules in a natural deduction system, or right and left rules in a sequent calculus (more on these rules in the next section).

In what follows I will employ sequent calculi with single sentences in the conclusion or succedent. Capital Greek letters stand for sets of sentences, referred to as ‘contexts’. In general contexts are nonmaximal. Lowercase Greek letters are names of single sentences. For ease of reading I will often ignore use/mention distinctions. The turnstile ‘ $\vdash$ ’ denotes an inferential relation between sets of sentences and sentences. I will equivalently speak of these inferential relations as consequence relations. Read the sequent ‘ $\Gamma \vdash \phi$ ’ as ‘ $\Gamma$  implies  $\phi$ ’ or ‘ $\phi$  is a consequence of  $\Gamma$ ’ or ‘there is a derivation of  $\phi$  from  $\Gamma$ ’. The sentences on the left side of a sequent are the

---

<sup>28</sup> The material drawn together here has been shaped by my exposure to the discussion group on non-monotonic logic that Robert Brandom has been running for the last few years, though the particulars of my perspective do not reflect the interests motivating Brandom and his assistants. Whereas Brandom is interested in a non-monotonic logic for all of the logical operators, I am here using a non-monotonic consequence relation to spell out Sellars’ account of the subjunctive conditional as a rule of inference, and in doing so I graft this non-monotonic material consequence relation to a monotonic formal consequence relation determined by standard Left and Right rules for the logical operators.

*premises*, the singleton sentence on the right the *conclusion*. The proof-theoretic notion of the inferential role of different vocabularies, embodied in right and left rules for the logical operators, has a corresponding embodiment in the circumstances and consequences of application for sentences and non-logical subsentential content (more on this in **2.1.3**).

When working with a sequent calculus there are three levels of discourse that need to be marked, each successive level concerned with articulating the relations of the one before it: object-language, proof-language, and metalanguage. The object-language contains sentences used to make claims about nonlinguistic states of affairs—e.g., that the apple is red and ripe. The proof-language is used to represent relations of consequence among object-language sentences—e.g., that the sentence ‘the apple is red and ripe’ has the sentence ‘the apple is red’ as a consequence. Finally, sentences in the metalanguage lay down the rules that codify the relations of proof or derivation that hold among the object-language sentences—e.g., that a conjunction is a consequence of a set of sentences just in case each conjunct is a consequence of that set. By giving metalinguistic rules that govern the use of different object-language vocabularies in terms of their role in inference, a proof-theoretic approach toward language understands the relationship between the object-language and the metalanguage in terms of the notion of proof or derivation.

To see how these three levels of language interact consider the metalinguistic rule governing the use of the horseshoe on the right of the turnstile (analogous to the introduction rule for the horseshoe in a natural deduction system):

$$\supset R: \Gamma, \phi \vdash \psi \Rightarrow \Gamma \vdash \phi \supset \psi$$

This rule states that if  $\psi$  is a consequence of  $\{\Gamma, \phi\}$ , then  $\phi \supset \psi$  is a consequence of  $\Gamma$ . Here the displayed arrow ' $\Rightarrow$ ' and the natural language 'if...then...' in the paraphrase are metalinguistic locutions, the sentences displayed in that rule range over the object-language, and the turnstile ' $\vdash$ ' is an operator in the proof-language. The turnstile is used to say that some object-language sentence is a consequence of some object-language premise set. It therefore communicates in the proof-language that the inference from a set of object-language sentences (the premises) to another object language sentence (the conclusion) is a good one. That such an inference is good is fixed by the metalanguage—introduction and elimination rules for the vocabularies of the language, together with whatever structural rules are in force.

Though I will not be addressing semantics directly, when I have need to talk about states of affairs described by the sentences in a context I will speak of *situations*, *states of affairs* or *facts*. In a model-theoretic approach toward language one would be compelled to say more about the way situations specify conditions of truth for the sentences of a context, and of the way sentences represent these situations according to the semantics the model provides. Instead I want to point to some of the ways that situations and contexts differ when considered proof-theoretically. Given the close connection between contexts as sets of sentences and situations as collections of facts, and between metalinguistic material inferences and object-language intensional vocabularies like the subjunctive conditional, it is important that we keep these two sorts of locutions distinct. When considering natural languages this distinction is all the more important. While (for many sorts of discourses) it is common for different speakers to share situations, it is not uncommon for speakers to differ substantially concerning the contexts they are committed to, both in terms of the sentences they accept as true and in terms of the material rules they take to govern those sentences (think of what 'he's a conservative' means to different peo-

ple). Nevertheless, communities can share commitments concerning contexts, both in terms of the sentences they accept and in terms of the rules they take to govern the uses of those sentences, and there is a sense in which the aim of a science is to construct an agreed upon context and rules of inference for representing some class of situations. Furthermore, if we assume, as I take it most of us most often do, that the past is set and the future open, the story of the development of a situation will be cumulative. But a context, as the set of sentences any one (or community) of us at some point takes to be the case for some situation, is often going to be revised on the basis of things that we learn over the course of inquiry and conversation. And that revision may include removing sentences from an updated context that, in the corresponding situation, we now learn were never the case. It also may involve revising the rules of inference we take to govern some of our sentences.

Because inferential commitments can vary from speaker to speaker, both in terms of what they explicitly assert and in terms of what they take to justify and follow from what they explicitly assert, it can happen that different speakers employ different sets of material rules of inference. For this reason it will not in general follow from the fact that two speakers are committed to one and the same set of sentences  $\Gamma$  that they accept all and the same consequences. This can be true even if both speakers accept the same *formal* rules of inference. By indexing the rules of inference that define the material fragment of a given consequence relation to individual speakers (and communities), it will be possible to see various object-language assertions as means of triangulating inferential commitments around a common conception of the objects of inquiry. Nevertheless, again precisely because of this close connection between contexts and situations, it must be understood throughout that talk of something like the truth of a subjunctive in a situation or of the goodness of an inference at a context are two different means of communicating what

is, at bottom, a common notion appearing on both sides of the word/world divide. And because the material fragment of the consequence relation is to be determined by inquiry into the specific objects and relations that are the subject matters of different domains of inquiry (for this is what it means to call the consequence relation *material*), I will take specific material rules of inference for granted throughout most of what follows. The worth of this posit will be found in the use it can be put in explaining surrounding bits of the linguistic landscape, and the aim of this chapter is to show how to use pre-existing practices of explanation to construct such a set of material rules of inference.

### 2.1.2 FORMAL AND MATERIAL CONSEQUENCE

One of the strengths of the sequent calculus, viewed as a tool for contrasting expressivist with representationalist theories of meaning, is that it lets us reason about the inferential role of object-language sentences without having to use a model-theoretic metalanguage of truth and representation. Instead, the metalanguage is *proof*-theoretic: it fixes the interpretation of object-language logical vocabulary by specifying the left and right rules (elimination and introduction rules) of that vocabulary, along with the structural rules of the language itself (e.g. **Cut** and **Weakening**). On a model-theoretic perspective the metalanguage makes use of objects, sets of objects, worlds, etc. so as to give truth-conditions for the metalinguistic relations that determine the consequences that hold among object-language sentences. But on the view developed below the metalanguage makes use of material and formal rules of inference in order to specify the metalinguistic relations of consequence that hold among the object-language sentences. As we will see in 2.1.3, this will allow us to introduce a proof-theoretic notion of the *comprehension*,

content-relevant introduction and eliminations rules, for the sentences of the language, analogous to model-theoretic notions of extension understood via denotation.

Consider a language constituted by a set of sentences constructed from the Boolean operators in the usual fashion, and governed by a corresponding consequence relation (for my purposes it is immaterial whether this consequence relation classical or intuitionistic). This consequence relation is defined by a set of structural rules together with Right and Left rules for each of the logical operators. The structural rules will include rules such as **Containment**:

**Containment:**  $\Gamma, \varphi \vdash \varphi$

which says that any sentence that is contained in a premise set is a consequence of that set, and

**Left Weakening:**

**Left Weakening:**  $\Gamma \vdash \varphi \Rightarrow \Gamma, \psi \vdash \varphi$

which says that if a sentence is a consequence of a premise set then it is a consequence of a superset of that premise set. Call the consequence relation defined by these rules a *formal* consequence relation (symbolized by  $\vdash_f$ ). The rule of **Containment** can be thought of as a list of axioms, and a theorem in a system of formal consequence is a sequent whose justification appeals

only to axioms (instances of **Containment**) and the formal (structural and logical) rules of inference.<sup>29</sup>

Now consider a set of primitive rules of inference introduced into the metalanguage of such a consequence relation.<sup>30</sup> These rules can be thought of as material axioms, analogous to the formal axioms determined by the rule **Containment**. Call the fragment of the proof-language defined by these additional rules of inference the *material inferential frame* ( $\vdash_m$ ) of the combined consequence relation. I will only consider material inferential frames that include non-monotonic rules of inference: it can happen that a sentence that is a material consequence of a context is not a consequence of a superset of that context. The point is straightforward in the subjunctive mood: if the vase were knocked over it would break, but if the vase were knocked over and wrapped in bubble wrap it would not break. Whereas the formal consequence relation is individuated according to a small class of structural and left and right rules, the material inferential frame is represented by a set of material rules of inference that will in general be fairly complex.

A class of material inferential frames  $\mathbf{MI}^n$ , where each  $\mathbf{MI}^i \in \mathbf{MI}^n$  is a set of material axioms or rules of inference, can be considered on this basis. Each  $\mathbf{MI}^i$  can be thought of as the material inferential frame employed by a speaker at a time. It is of course also possible, at least in principle, that a material inferential frame is shared by a community of speakers (I will have more to say about this shortly). As a global stipulation, each material inferential frame  $\mathbf{MI}^i$  is subject to the following restriction:

---

<sup>29</sup> In a tree proof, a sequent is a theorem just in case there is a tree rooted in that sequent all of whose leaves are instances of **Containment**.

<sup>30</sup> See Negri and von Plato (2001), chapter 6, for the introduction of material rules of inference into a monotonic sequent calculus.



$$\Gamma \vdash_m p \Rightarrow \Gamma \not\vdash_f p$$

When the formal and material rules define the totality of the consequence relation, this restriction guarantees that the material inferential fragment for any given combined consequence relation is the complement of the formal fragment:

$$\Gamma \vdash_m \phi \Leftrightarrow [(\Gamma \vdash \phi) \text{ and } \Gamma \not\vdash_f \phi]$$

And this means that the consequence relation marked by the unsubscripted turnstile can be thought of as the union of the formal and material fragments of that relation (for a given  $\mathbf{MT}^i$ ).

In the presence of a semantics, a material consequence from a set of sentences to a sentence is one that is underwritten by facts concerning what it is to be the entities (objects, events, properties, etc.) denoted by the terms used in at least some of those sentences. Just as the formal consequence relation can be thought of as encoding the goodness of an argument from sets of sentences of the language (premises) to sets of sentences (conclusions), and this relation in turn defined by the structural and logical rules of the calculus, we introduce a non-monotonic material consequence relation by stipulating that some non-formally valid sequents encode good inferences. And for a well-defined consequence relation, by taking the closure of the material consequences under the rules governing the logical operators we can settle when logically complex sentences are implied by the material rules of inference for a given  $\mathbf{MT}^i$ . For instance, if  $\phi$  has both  $\chi$  and  $\psi$  as consequences at some context, at least one of which is material, then from the Right rule for conjunction it will follow that  $\phi$  has  $\chi \& \psi$  as a material consequence at that context.

But because that material inference can be defeated, the conjunction can be defeated as well. Similar remarks hold for the computation of the material consequences that hold when logically complex sentences occur on the left of the turnstile.<sup>31</sup>

But now we face the first problem, for how are we to go about individuating the **MI**<sup>i</sup> used by some speaker or community? I have been presupposing a collection of material rules or axioms, but I have not said anything about how to select them. The main result of part 2 is that a variety of subjunctive conditionals can be understood to give object-language expression for corresponding rules of inference (including even formal rules of inference) so that the added material inferential expressive resources of the consequence relation outlined in part 1 will have its object-language correlate in the subjunctive conditionals introduced in part 2. In this way the subjunctive ‘>’ shows up as something like an object-language transposition of a metalinguistic material rule of inference encoded by the proof-theoretic turnstile ‘⊢’. It also provides a basis for different speakers to converse and triangulate over a common material inferential frame. For because our material inferential frames can change over the course of inquiry, the process of in-

---

<sup>31</sup> In order to produce a well-defined consequence relation the structural and Right and Left rules for the logical operators would need revising so as to insure that monotonicity is not forced onto the material fragment. For instance, **Containment** would be defined as a formal rule of inference and the rule for **Left Weakening** would read:

**Left Weakening:**  $\Gamma \vdash_f \phi \Rightarrow \Gamma, \psi \vdash_f \phi$

The key idea is to introduce the material rules of inference in such a way that they preserve the monotonicity of the formal fragment of the consequence relation, while the rules of the formal fragment that would force monotonicity for the material fragment (e.g. **Left Weakening**) are restricted in application to those consequences that are underwritten by the formal rules of inference. That is, the application of a rule results in a sequent encoding a formal consequence only if the sequent(s) that instance the antecedent of a rule are formal. Monotonicity is thereby ensured for the formal fragment on account of the fact that the formal sequents are all rooted in trees with leaves of containment, and any superset of a sequent that encodes a formal consequence will contain all of the same sentences used in the derivation from the subset context. To avoid incoherence of the resulting system, it must also be the case that the material rules are introduced in such a way that they do not license derivations that are incompatible with those licensed by the formal fragment of the language. In doing so one ensures both that no formal consequence is defeated by the addition of new premises, and that some material consequences are defeated by the addition of new premises. But the intuitive idea of material consequences needed to interpret the subjunctive conditional in part 2 of this chapter can be motivated independently of that formalization.

quiry has the practical effect of constructing a community's material inferential frame. And it happens that the object-language assertion of a subjunctive expresses that some inference is part of (or should be added to) the material inferential frame of a community. But before looking at particular  $\mathbf{MI}^i$  and the subjunctive conditional, I want to introduce a notion for the *comprehension* of the sentences of a language, as a proof-theoretic complement to a model-theoretic notion of extension, by showing how a material inferential frame can be used to give introduction and elimination rules for those sentences. This will set up the second problem to be addressed in part 2.

### 2.1.3 MATERIAL RULES OF INFERENCE AND THE COMPREHENSIONS OF SIMPLE SENTENCES

Just as the formal rules of inference for the Boolean logical operators can be thought of as giving a definition for those operators, so can the material rules of inference be used to give rules for the use of the non-logical parts of the language. Let  $\mathbf{A}\sim$  symbolize the atomic sentences and their negations for the language under consideration, and call this class the *simple sentences*. Now consider some material inferential frame  $\mathbf{MI}^i$ . Given a background commitment to interpreting material inferences as those that are underwritten by facts concerning the subjects under discussion, together with a supposition that only some sentences are materially relevant for an inference at a context, it would seem that the rules of each  $\mathbf{MI}^i$  should be specified according to the sentences that are relevant to the inference. And this specification, this additional bit of metalinguistic structure, can be used to define the material inferential role, understood as the introduction and elimination rules, of the simple sentences of the language. This can be done as follows.

For each  $\phi \in \mathbf{A}^\sim$  we assign a pair of sets of sequents from  $\mathbf{MT}^i$  subject to the following restriction: each sequent of the first set has  $\phi$  as the conclusion (giving its right rules or material inferential circumstances of application), and each sequent of the second has  $\phi$  as part of the premises (its left rules or material inferential consequences of application). These pairs of sequents give the left and right material rules of inference for the associated simple sentence, primitive right and left rules for each simple sentence analogous to the left and right rules that proof-theoretically define the logical operators. Adopting language Dummett uses to talk about a generalization of logical introduction and elimination rules to the nonlogical sentences of a natural language, call these the *circumstances and consequences of application* of the sentence in question—denoted individually by numbered right and left rules for each  $\phi \in \sim\mathbf{A}$ . I will refer to the circumstances and consequences of application of a simple sentence as its *comprehension*. We can represent the comprehension of a sentence as numbered right and left rules for each  $\phi \in \mathbf{A}^\sim$  as follows:

### **Circumstances of $\phi$**

$\phi\mathbf{R}^1: \Gamma \vdash_m \phi$

$\phi\mathbf{R}^2: \Delta \vdash_m \phi$

.

.

.

### Consequences of $\varphi$

$\varphi L^1$ :  $E, \varphi \vdash_m \chi$

$\varphi L^2$ :  $E, \varphi \vdash_m \psi$

.

.

.

$\varphi L^{n+1}$ :  $Z, \varphi \vdash_m \omega$

$\varphi L^{n+2}$ :  $Z, \varphi \vdash_m v$

.

.

.

Notice that the contexts that are used to specify the comprehension of a sentence may include logically complex sentences. When considering natural languages it is important to remember that in addition to the intralinguistic circumstances and consequences of application of different sentences, some sentences will also be associated with observational circumstances of application (language-entry moves like ‘lo, smoke’) and volitional, imperatival, or behavioral consequences of application (language-exit moves like ‘I shall leave the building’ or the corresponding action).

Nothing I have said settles which material inferences are associated with which simple sentences, and it may be that the semantics of these sentences as determined by a particular model will tell us how to proceed. But notice that, in order to represent material rules of inference, it is neither the case that every occurrence of a sentence as the conclusion of a set of sentences

should count as part of the circumstances of application of that sentence, nor every occurrence of a sentence in a premise count as consequence of application of that sentence. Only relevant occurrences (in some sense of ‘relevance’) of a sentence in an inference should be part of that sentences circumstances and consequences of application. In addition to needing to settle how to construct particular material inferential frames (the problem of effability), we are faced with the problem of determining, for a given frame, which inferences are associated with which sentences in the language. This is the problem of comprehension. After showing how to use the subjunctive conditional to resolve the problem of effability, part 2 will address the problem of comprehension by considering the interaction between the subjunctive conditional and modal explanatory operators like ‘because’ and ‘in virtue of the fact that’. And so on the basis of the interpretation of the subjunctive conditional given there, I will show how to use pre-existing practices of explanation so as to individuate the class of material inferences that count as part of the comprehensions of different sentences.

## 2.2 INTRODUCING THE SUBJUNCTIVE CONDITIONAL

### 2.2.1 SUBJUNCTIVES, COUNTERFACTUALS, ‘EVEN IF’ CONDITIONALS, AND ‘ONLY IF’ CONDITIONALS

Unless otherwise noted, all throughout the rest of the chapter the discussion proceeds against the background assumption of a particular material inferential frame  $\mathbf{M}^i$ .

With a metalanguage that includes non-monotonic material rules of inference, the assertion of a subjunctive  $\phi > \psi$  at a context  $\Gamma$  can be understood as an expression of the claim that there is a derivation of  $\psi$  from the context that results from supposing  $\phi$  at  $\Gamma$ —in the case where  $\phi$  is a noncounterfactual subjunctive supposition, that context will be  $\Gamma \cup \{\phi\}$ . That is, to assert an object-language (noncounterfactual) subjunctive

$$\phi > \psi$$

at a context  $\Gamma$  is to express commitment to the goodness of the following derivation:

$$\Gamma \cup \{\phi\} \vdash \psi$$

On the current approach, whatever one might suppose is *said* with a subjunctive conditional, what one is *doing* in *asserting* such a claim is expressing commitment to the corresponding proof-theoretic relation as underwritten by some rule (material or formal) of inference. So much is true of many conditionals, and for non-counterfactual indicative and subjunctive conditionals this will suffice. The addition of a counterfactual supposition to a context creates an incoherent premise set, however, and for this reason counterfactual indicative and subjunctive conditionals (e.g. ‘if Oswald didn’t shoot Kennedy someone else did’ and ‘if Oswald hadn’t shot Kennedy someone else would have’) cannot be understood to express this relation. For given that anything follows from a contradiction in classical logic, this would make every proper counterfactual conditional trivially true.

The possible worlds response to this problem is to evaluate the truth of the consequent of a counterfactual at the world ‘most similar’ to the world of utterance where the antecedent is true, making allowances for the fact that indicative and subjunctive counterfactuals involve different similarity relations. My approach effectively mirrors this in a material inferential meta-theory, and for simplicity I will focus on the subjunctive conditional (similar remarks go through for counterfactual indicatives). What is needed for evaluating proper counterfactuals is for the supposition of  $\phi$  at  $\Gamma$  to induce a shift of evaluation to some set of sentences that is, intuitively, a minimal revision of  $\Gamma$  brought on by the counterfactual supposition of  $\phi$  (so long as a language has a negation operator there will always be the possibility of proper counterfactuals). We do this by defining a function **u** (for ‘update’) from pairs of sets of the language and singleton sentences to sets of the language:

$$\mathbf{u}: [\mathcal{P}(\mathbf{L}) \times \mathbf{L}] \mapsto \mathcal{P}(\mathbf{L})$$

Thus our metalanguage must include a set of formal rules of inference, a set of material rules of inference, and an updating function **u** from context/sentence pairs to contexts that are to be thought of as the minimal revision of the first context on the supposition of that sentence (though **u** is only needed for evaluating counterfactual subjunctives).<sup>32</sup> Whereas the combined

---

<sup>32</sup> The formal rules of inference define a function from the powerset of the language to the powerset of the language—premises to conclusions:

$$\mathbf{f}: \mathcal{P}(\mathbf{L}) \mapsto \mathcal{P}(\mathbf{L})$$

The set  $\mathbf{f}(\Gamma)$  is the set of consequences of  $\Gamma$ . Different rules (e.g. for classical and intuitionistic logic) will define different formal consequence relations. Similarly, each material inferential frame  $\mathbf{M}\mathbf{I}^i \in \mathbf{M}\mathbf{I}^n$  defines a function  $\mathbf{m}^i$  from and to sets of the language:



formal and material consequence relation is a proof-theoretic metalinguistic analogue to a model-theoretic domain of possible worlds, the updating function  $\mathbf{u}$  corresponds to a similarity metric across possible worlds—intuitively, one updates just in case an incompatibility would result, and this because the subjunctive supposition underwrites a derivation to some sentence incompatible with some sentence implied at that context. And so whereas the possible worlds theorist gives a model theory for subjunctive conditionals in terms of similarities across possible worlds, the Sellarsian takes as her explanatory primitive a structured consequence relation defined over the sentences of a language. Whether  $\psi$  is implied by  $\mathbf{u}(\Gamma, \phi)$ —the set of sentences corresponding to the supposition of  $\phi$  at  $\Gamma$ —is computable from the underlying consequence relation and the logical rules of inference, and for this reason we can use this consequence relation to give a metalinguistic expressive analysis of the object-language use of a subjunctive conditional. With a combined formal and material consequence relation of the sort introduced above, the assertion of a subjunctive at a context can be understood as an object-language expression of the corresponding rule of inference.

Two additional qualifications allow us to define two subspecies of subjunctive conditional, both of which have some use in natural language. In contexts where the inference to some sentence  $\psi$  is not defeated on some supposition  $\phi$  it is natural to use an ‘even if’ locution: even if there were another gallon of gas in the tank we would not be able to make it without stopping. We can understand use of the ‘even if’ subjunctive as an operator that gives expression *both* to

---


$$\mathbf{m}^i: \mathcal{R}(\mathbf{L}) \mapsto \mathcal{R}(\mathbf{L})$$

Together with a given update function  $\mathbf{u}^i$ , a combined consequence relation can then be understood as a triple of formal and material consequence relations, for given formal and material inferential frames, together with an update function:  $\langle \mathbf{f}, \mathbf{m}^i, \mathbf{u}^i \rangle$ . I suppress concern with the class of update functions and continue to speak of a single function  $\mathbf{u}$ .

the goodness of an inference (to the consequent of the conditional) at the context of utterance *and* to the goodness of that inference from the context arrived at on supposition of the antecedent. This subjunctive likewise gives object-language expression to a feature of the underlying non-monotonic consequence relation: ‘even if  $\phi$ , then  $\psi$ ’ or ‘ $\psi$  even if  $\phi$ ’ communicates that the addition of some premise  $\phi$  to a context does not infirm an inference to  $\psi$ . This device lets us use the object-language to mark off regions of monotonicity in the metalanguage—inferential contexts where a localized antecedent strengthening holds.<sup>33</sup> We will see that the ontic modals play a similar role. On the other hand the ‘only if’ subjunctive gives expression to the fact that an inference to the consequent would not go through unless the antecedent is supposed: only if there were 5 more gallons of gas would we be able to make it without stopping. This device can be used to carve out some region of logical space where additional suppositions will not underwrite an inference to a sentence unless the hypothesis of the ‘only if’ conditional is supposed to hold. In this way the general subjunctive introduced above has as its expressive role the union of the roles for the ‘even if’ and the ‘only if’ subjunctives.

### 2.2.2 A WORRY ABOUT CIRCULARITY

It might be thought that the minimal revision update function **u** that determines the felicity for the assertion of a subjunctive on the basis of whether there is a derivation of the consequent from the context set arrived at upon the supposition of the antecedent takes for granted that which needs explanation. After all, what right is there to suppose that the minimal revision of a context

---

<sup>33</sup> One problem with this definition is that it requires that  $\psi$  be true at  $\Gamma$ ; Pollock's (1976) definition for ‘even if’ also shares this feature, but as he notes with an example David Lewis suggested, it sometimes makes sense to use ‘even if’ in a case where the consequent is not thought true (p.30).

upon supposition of an antecedent is a well-defined notion? And at any rate, how are we supposed to go about determining what the output of that function is for any given input?

An analogous worry was raised against David Lewis' account of the similarity relation as discussed in his *Counterfactuals* (1973), and I think we gain some purchase on understanding what the minimal revision function presupposes by considering Lewis' response to that worry. While the (relative) similarities among different situations is an intuitive notion in many cases, in reviews of his (1973) Jonathan Bennett (1974) and Kit Fine (1975) pointed out that Lewis' analysis of the truth conditions of a counterfactual in terms of similarity looked to get the wrong answer in some cases. For we can ask what would have happened if Nixon (or his generals, etc.) had pushed The Button that starts a nuclear war, and in a fairly obvious sense the world most similar to ours where Nixon presses The Button is a world where there was no war. For the world that is just like ours but where Nixon presses The Button and no nuclear war happens only differs from ours in that Nixon presses The Button, together with whatever minor violation of the laws of nature is needed to see to it that the (actually) well-wired Button does not work as it (lawfully) should, whereas the world where Nixon presses The Button and there is a war is a world that differs from ours in all sorts of ways. Isn't one local violation of a law of nature worth a whole lot of change in ordinary happenings? If so, it looks like 'If Nixon had pushed The Button then there would have been a nuclear war' is false. But that seems wrong. The similarity relation that Lewis took for granted in specifying the truth conditions for counterfactuals needed more commentary.

On the basis of Bennett's and Fine's objections, Lewis wrote "Counterfactual Dependence and Time's Arrow" (1979) so as to show that, for instance, we weight a violation in a law of nature a lot more heavily than we do a radical redistribution of objects in space and time that

does not require a violation of a law of nature (as we get with a nuclear war). In this way he began to build up a list of conditions that constrain what is to count as determining similarity. In doing so Lewis is explicit that we are not to suppose that the similarity relation can be specified independently of our grasp of which subjunctives are true. Rather, we use our grasp of the truth of various subjunctives in order to determine how to specify the similarity relation. After introducing his analysis of counterfactuals in terms of similarity, which he calls ‘Analysis 2’ in this paper, Lewis writes (p.43, emphasis added):

The thing to do is not to start by deciding, once and for all, what we think about similarity of worlds, so that we can afterwards use these decisions to test Analysis 2....Rather, we must use what we know about the truth and falsity of counterfactuals to see if we can find some sort of similarity relation—not necessarily the first one that springs to mind—that combines with Analysis 2 to yield the proper truth conditions. It is this combination that can be tested against our knowledge of counterfactuals, not Analysis 2 by itself. In looking for a combination that will stand up to the test, *we must use what we know about counterfactuals to find out about the appropriate similarity relation—not the other way around.*

Trade ‘similarity of worlds’ for ‘minimal revision of contexts’, and the worry about an unspecified minimal revision function that updates premise sets on the basis of the supposition of a subjunctive’s antecedent should be handled in the way that Lewis handles the worry about similarity. In both cases it would be a mistake to think that the function in question ought to (or even could) be settled independently of our grasp of the truth or assertibility of various subjunctive conditionals. While this order of understanding is plausible in constructing a formal semantics, it cannot be supposed that in the process of determining, in practice, which subjunctives are true in

a language we first determine the metalinguistic rules that govern the meanings of terms and sentences and then decide what the modal facts are. Rather, the process of determining the meanings of the sentences of our language and determining what we are to think of the world is one that proceeds from both directions at once, and the metalinguistic codification of the rules that govern the object-language is a late-coming affair. In fact, there is some reason to think that (as Lewis intimates) the order of explanation is reversed: rather than supposing the minimal revision/similarity function must be specified independently of our grasp of the assertibility/truth of various subjunctive conditionals, it is our grasp of the assertibility/truth of various subjunctive conditionals that will act as a constraint on specifying the corresponding function.

In taking the minimal revision updating function for granted here, and proposing to use the object-language employment of counterfactuals as a constraint on how to determine that function, I am in this regard no worse off than Lewis. In fact, given the order of explanation I have adopted this consequence is to be expected. For our grasp of subjunctive conditionals concerning the world and its objects is to be explained by whatever understanding we have of the world and its objects, so that to determine the rules that govern the language, which rules have their object-language expression in subjunctive conditionals, is to determine an understanding of the world. It is quite right, then, that we should use an antecedent grasp of the assertibility of various subjunctive conditionals as a constraint on the update function that governs the material inferential role of different sentences, for that is the method by which we settle what the world-denoting terms in the language are to mean.

In future work I hope to have more to say about what sorts of constraints count as determining the minimal revision of a context upon supposition of an antecedent, but for the purpose of explaining object-language use of the subjunctive conditional in terms of metalinguistic infer-

ential relations, that update function will be taken for granted for now. And at any rate it is worth pointing out that the update function *is* specified for non-counterfactual subjunctive conditionals—one simply takes the union of the context and the antecedent and computes the truth of the subjunctive on the basis of whether there is a derivation of the consequent at the set that results from that union. It is only proper counterfactuals that require more discussion.

### 2.2.3 MATERIAL INFERENCE AND THE REPRESENTATION OF FACT

Two features of the subjunctive conditional that distinguish it from the horseshoe can be explained by this analysis: the failure of antecedent strengthening, and the failure of contraposition, both of which are valid for the horseshoe:

**Antecedent Strengthening:**  $[\Gamma \vdash \phi \supset \psi] \Rightarrow [\Gamma \vdash (\phi \& \chi) \supset \psi]$

**Contraposition:**  $[\Gamma \vdash \phi \supset \psi] \Leftrightarrow [\Gamma \vdash \sim\psi \supset \sim\phi]$

The failure of antecedent strengthening for the subjunctive conditional can be explained by the fact that the consequence relation it gives object-language expression to is non-monotonic over its material (nonlogical) fragment. While the addition of  $\phi$  to a context  $\Gamma$  may underwrite an inference to  $\psi$  it does not follow that the addition of  $\phi$  and  $\chi$  to  $\Gamma$  underwrites that inference: from the fact that if the vase were broken the host would be angry it does not follow that if the vase were broken and her lottery ticket was a winner the host would be angry. Just so, the failure of contraposition for subjunctives is a reflection of the non-monotonic fragment of the consequence relation: from the fact that if the vase were to break the host would be angry it does not follow

that if she were not angry the vase would not be broken, for if her ticket were a winner then the vase could be broken and the host not be angry. Finally, notice that because the formal fragment of the language is monotonic, subjunctives that are true at a context because of a formal rule of inference, e.g.  $\phi > \phi$ , will permit antecedent strengthening, just as they do.

On the current approach, the non-monotonicity of material inferential relations and the failures of antecedent strengthening and contraposition for the subjunctive conditional are two sides of one facet of our rational economy—one at the level of the object-language with which we reason about the world, the other at the level of the metalanguage within which we specify the rational relations among those object-language sentences. In this way the subjunctive conditional shows up as something like an object-language transposition of a metalinguistic (material non-monotonic) consequence relation. The Janus-faced character of this aspect of our rational engagement with the world is particularly evident when thinking about (our understanding of) middle-world objects and properties. The causal connection that stands between some process or event and its outcome is often highly sensitive to environmental conditions. Change those conditions in certain ways and that connection is severed. If grasp of the manifold variety through which objects and properties interact with one another is a condition on a grasp of those objects as determinate particulars, then the non-monotonicity of material inferences and the failure of antecedent strengthening and contraposition for the subjunctive conditional are nonaccidental features of the systems of thought with which finite minds come to know the world.<sup>34</sup> The leading idea of the current project is that our grasp of such rational relations is conditioned by our understanding something about the kinds of objects (vases, winning tickets), events and capaci-

---

<sup>34</sup> They may even be “elements in a conceptual framework which *defines* what it is to be a finite knower in a world one never made” Sellars (1979), §73, emphasis added.

ties (falling, breaking), and people (the host) involved rather than because we are enthymematically filling in a logical calculus whose rules are indifferent to the material content of the sentences of the language. That objects have a *subjunctive background*, a space of possibility that situates them ontologically with regard to the rest of the world, is reflected in the fact that corresponding terms in the language we use to talk about them are situated in a *material inferential* space of reasoning.

#### 2.2.4 THE SUBJUNCTIVE CONDITIONAL AND THE PROBLEM OF EFFABILITY

Throughout this discussion I have assumed a set of material rules of inference, and the problem of effability is the problem of determining a particular material inferential frame. In **2.1.1** I mentioned that while situations are (in the relevant sense) common between speakers and cumulative over time, contexts can vary substantially from person to person and may develop both by way of deleting some sentences that are no longer taken to follow from an updated context, and by revising the metalinguistic rules that govern the consequence relation. But despite the inevitable variability between the material inferential frames of different speakers, it is in principle possible that the members of a community share a material inferential frame. And it is something like the prescriptive ideal of a science that the members of a community do share a frame of reasoning. If subjunctive conditionals are interpreted as the object-language expression of a material rule of inference, then one role the assertion of a subjunctive can play is in communicating to an auditor that she should *change* her material consequence relation so as to include the new inference. And this means that subjunctive sentences at least sometimes function as devices for debating not only our first-order views about the world, but also coordinating a set of rules of inference



governing the metalinguistic structure of these worldviews. And they do so without having to adopt the explicitly metalinguistic resources of truth and inference.<sup>35</sup> Given the role that conversation and debate plays in determining what any one of us believes, the practical capacity to deploy object-language subjunctive conditionals is, on a material inferential interpretation of the subjunctive conditional, a capacity that underwrites and makes possible the communal revision of the rules of inference that govern the material fragment of the language. Assuming a common context, the process of sorting out which material rules of inference govern those sentences is a process of sorting the true from the false subjunctive conditionals. And so because the assertion of a subjunctive conditional in the object-language can be understood as the expression of commitment to a corresponding inference, the construction of a material inferential frame can proceed by attending to the linguistic dispositions of a community concerning the subjunctive conditionals they go in for.

Seen by this light, the problem of effability does not need to be solved with more theory so much as dissolved by reorienting our perspective on the relationship between inference and justification. If we see our task as one of determining which inferences are good, and so prescriptively constructing a material inferential frame **MI**<sup>i</sup>, semantic ascent will take us into a meta-metalanguage in order to lay down rules for determining which material rules of inference to go in for. If, on the other hand, we see our task as one of explicating the inferential commitments we take up on the basis of the first-order explanations we give with different object-language vocabularies, then it is possible to use those first-order explanations in order to construct a descriptive account of what our practices of reasoning already commit us to. With a

---

<sup>35</sup> Carnap (1934), §§80-1, makes similar remarks about the value of what he refers to as the ‘material mode of speech’.

suitable metalinguistic interpretation of these vocabularies, the abstract problem concerning how to determine the material rules that define a particular **MI**<sup>i</sup> becomes a descriptive task, a project to be undertaken.

At this point that project may not seem all that interesting—after all, what point would there be to wade through the motley collection of inferential dispositions of individual speakers searching for some systematic account of any of the material inferential frames they employ? But this worry mistakes a waystation for the destination. I am currently building up a set of resources to be put to use in looking at intensional/modal language more generally, and at this point I only mean to emphasize that the construction of the languages under consideration here proceeds by recourse to practices of explanation that speakers habitually employ.

#### 2.2.5 TWO-PLACE EXPLANATORY OPERATORS AND THE PROBLEM OF COMPREHENSION

Recall that the material inferential frames introduced in section 2.1.2 were used in 2.1.3 to define the comprehensions of the simple sentences, but with the caveat that only relevant occurrences of a sentence in an inference would count as part of the circumstances and consequences of application of a simple sentence. If each simple sentence in the language is given material inferential right and left rules (circumstances and consequences of application) then this relevance condition will be represented in the proof language by the fact that an inference from ‘the match is struck’ to ‘the match is lit’ is underwritten either by a left rule for the former or a right rule for the latter.<sup>36</sup> But just as we needed some criterion for determining which inferences were good and

---

<sup>36</sup> One might allow both that there are material inferences that are underwritten by particular sentences, and others that are included in an undifferentiated list of axioms; this would alleviate a worry that one was supposing it was

which bad, the problem of comprehension requires we lay down some method for determining which particular sentences underwrite which inferences.

Intensional conjunctions like ‘and for this reason’ and ‘because’ can be interpreted as object-language devices for giving expression to the relevance of a sentence to a derivation, so that commitments concerning the material inferential circumstances and consequences of application for different sentences can be individuated on the basis of the use of these explanatory terms. Consider a sentence like “if the match were struck and the sun were setting then the match would light, because it was struck” or “if the match were struck then, for this reason, it would light”. If we think of each simple sentence as being associated with context-sensitive rules of inference, then we can see the assertion of these complex modal subjunctives as the object-language expression of the circumstances and consequences of application of the sentences occurring within them.<sup>37</sup> Sentences of the form “if the match were struck it would light *because* it was struck (or because it is a match, there is oxygen in the room, etc.)” mark off which rule(s) in that material inferential frame are used in the derivation of the inference encoded by that subjunctive. Being in possession of these rules, we can anticipate how to reason across different contexts. For if I am told that it is because the match is wet that it will not light when struck, then I will anticipate that at similar contexts wet matches will not light when struck. And we are equipped to make more fine-grained distinctions concerning the content of different sentences—e.g., one can dis-

---

*analytic* that every material inference was supposed to be underwritten by the content of particular sentences (my thanks to John McDowell for raising a worry along these lines). At any rate, when particular material inferential relations are not at issue it is convenient to ignore this additional structure and treat the rules/axioms as an undifferentiated collection.

<sup>37</sup> In more complex cases these claims give expression to something implied by a circumstance or consequence of application of a (set of) simple sentence(s). It would be interesting to compare the additional notation used here, connected to material rules of inference, to the notation Anderson and Belnap introduce for keeping track of relevant implication in a natural deduction system.

tinguish different mathematical truths according to the material rules in which they occur as premises and conclusions (on the right and the left of the turnstile), even though mathematical truths are true at every possible world. With this additional metalinguistic structure we can interpret the expressive role of additional object-language vocabulary, allowing us to use pre-existing practices surrounding the uses of these vocabularies to construct a descriptive account of the material inferential frame those uses give expression to. Just as habitual uses of the subjunctive conditional can be used to construct a material inferential frame, so can habitual uses of these more complex subjunctives be used to individuate the circumstances and consequences of application for the simple sentences of some linguistic community. And though it may make perfect sense to say that an inference is good because of what it means to be a match, the only sort of ontological question now facing us is one concerning matches as the kinds of thing they are—we need not suppose that any other sort of metaphysical commitment is taken up when we go in for these sorts of explanations.

This suggests we consider the sorts of subsentential content we might want our material inferential rules to be sensitive to. There can be no doubt that object-language expressions of this subjunctive/explanatory sort are instrumental in communicating general facts about the world, such as that matches are the kinds of things that light when struck in situations like these (one might think characterizing generics perform a similar function). To say ‘the match would, *qua* (in virtue of being) coated in phosphorus, light if struck’ is to say that the relationship between striking and lighting holds for matches because of what they are coated in. These sorts of explanatory vocabularies relate singular terms, open sentences, and kind terms to one another in a space of reasoning, giving a finer grain of detail to the material inferential frame of a language.

I will return to this suggestion when considering kind terms in sections **4.1.2** and **4.1.3** of chapter three.

#### 2.2.6 PURELY PRAGMATIC VOCABULARIES AND A NOTE ON GROUNDING EXPLANATIONS

We can now see how the combined material and formal consequence relations introduced in **2.1** can be put to use in the expressivist program of demystifying object-language metaphysical talk by interpreting that talk in terms of the rules of inference that govern a material consequence relation. For on this approach a range of object-language uses of terms like ‘because’ and ‘for this reason’ are understood not, as is the wont of contemporary metaphysicians, as marking some kind of new metaphysical structure,<sup>38</sup> but as a means to signal that an inference encoded by a subjunctive conditional is one that is underwritten by a material rule of inference for some sentence(s)—the relation marked by these explanations is a metalinguistic not a metaphysical one. On this basis a claim like ‘if the match were struck it would light, because it was struck’ and ‘in virtue of being what it is, the match would light if struck’ can be interpreted as a covert means of marking this material inferential structure. And if a material inferential frame  $\mathbf{M}^i$  is such that there are left and right rules for each of the simple sentences of the language then we can understand certain object-language modal operators as devices for marking this additional material inferential structure. In this way the expressivism developed here offers the prospect of engaging with metaphysical debates over grounding relations by interpreting certain occurrences of such

---

<sup>38</sup> Representative discussions are found in the essays collected in Manley, Chalmers, and Wasserman (2009), in Sider (2011), and the essays collected in Correia and Schnieder (2012). Some helpful introductory works are Correia (2008), Fine (2001, 2012a), Paul (2012), and Schaffer (2009). I wish to remain neutral on whether and in what sense some grounding explanations are metaphysical, causal, logical, etc.

expressions as ‘because’, ‘for this reason’, and ‘in virtue of’ as object-language means for expressing commitment to structural features of the material inferential space in which the sentences occurring in the judgments that use these expressions are situated. Object-language talk of *what it is to be* various kinds of thing can then be understood as expressing commitment to metalinguistic relations concerning *what it is to reason* with different terms in particular ways. And because the underlying consequence relation these sentences give expression to is a material one, there is a straightforward sense in which these sentences also represent the world, make claims about the way things are.

But one might worry that this approach merely pushes back the issue with which the representationalist is concerned in querying the status of grounding explanations. For once one has been given the putative rule of inference expressed by the complex modal claim ‘if the match were struck then, for this reason (or *qua* match), it would light’, it is perfectly in order to ask *in virtue of what* this inference holds. And here again we seem to need a grounding explanation. But here the work to be done is *empirical*, directed at specific features of the context and the objects under consideration. In answering the question ‘why is the match being struck the (a) reason the inference to it being lit is a good inference in this context?’ one makes recourse to prosaic facts about the objects and properties in question. We need not appeal to any general feature of grounding that is metaphysically laden in order to explain why that inference is a good one, why the corresponding subjunctive is true. Still less need we suppose that the use of ‘because’ as it occurs here will have the same basis of explanation as when the term is used in different sentences. There is little doubt, for instance, that the process by which we justify the use of a rule concerning matches and their lighting is not going to be much like the process by which we justify a rule of inference encoded in claims like ‘if Socrates were to exist then the singleton set

{Socrates} would exist, because Socrates existed (because of what it is to be a set, etc.)'. At the philosophers' level of consideration all that is shared by such sentences is a structure of explanation marked by the use of certain words, and on the current view it is first-order inquiry into the various kinds of objects that are referred to in such sentences that dictate the justifications we give concerning why these rules of inference are warranted. Nevertheless, there is a common structure of explanation here that the metalinguistic expressivist is in a position to characterize.

We can put this point by saying that, on the current account, grounding explanations are purely pragmatic. Whereas most object-language claims represent the world, and the subjunctive conditional can be understood to both represent the world and give expression to a rule of inference, purely pragmatic claims represent something about the language itself. The contrast with the subjunctive conditional is illustrative. Following Sellars and Brandom, I have argued for a modal expressivism on which those subjunctives that give expression to a material rule of inference *say something* about the world, while it is their *use* that is understood to give expression to a rule. By distinguishing what is *said* with a subjunctive from what is *done* in using it, the expressivist is able to hold that some target vocabulary both represents and expresses commitments concerning how to reason about the world. But with a purely pragmatic claim what is *said* and what is *done* are the same: the interpretation of such an object-language sentence is rendered by translating it into a sentence in the metalanguage. Now what is said is simply that the language is to be used in some way (similar remarks can be made about the interpretation of terms like 'law of nature' and 'essence').

If we countenance minimalism about representation-talk (as I will argue in chapter 5 the expressivist should), where any sentence uttered in a declarative mood can be said to represent the world, then we can suppose that in a grounding explanation one is representing the world,

saying of it that a particular fact obtains. But the material inferential modal expressivist need not invoke any more semantic/model-theoretic machinery to interpret those claims. Instead use of these terms is understood to express commitments concerning material rules of inference, and it is first-order inquiry into the objects, properties, and facts represented in the sentences of those inferences that determine why the explanations are good. On this view the only thing that is represented by a sentence like “if the match were struck then, *qua* match, it would light” is the subjunctive connection between striking a match and having it light as underwritten by facts concerning matches and phosphorous, flame and oxygen; the grounding expression shows up not as a special sort of representation, but rather as a means of relating representations to one another in a material inferential space wherein certain kind terms are privileged in drawing certain inferences (I will return to this point when discussing the comprehension of kind terms in **4.1.3**).<sup>39</sup> Such explanations thereby triangulate our rational grip on the world by drawing certain objects, properties, and facts into salience as we reason across different contexts, but the explanations themselves need not be supposed to represent anything beyond that which is represented by ordinary claims about those objects, properties, and facts. On the modal expressivism developed here we let first-order inquiry settle what we ought to believe about what it is to be different kinds of thing; the role of the philosopher is not one of determining ‘what it is to be’ something in some metaphysically heavy sense. Rather, hers is the role of accounting for what we are doing when we go in for these sorts of explanation, an account that explicates what we are doing in terms of expressions of commitment to different context-sensitive features of the material infer-

---

<sup>39</sup> This is something one might take from a claim Kant made in commenting on the ‘Modality’ heading from the table of the logical functions of judgment in the *Critique of Pure Reason*, A74/B99-100:

The modality of judgments is a quite special function of them, which is distinctive in that it contributes nothing to the content of the judgment (for besides quantity, quality, and relation there is nothing more that constitutes the content of a judgment), but rather concerns only the value of the copula in relation to thinking in general.



ential relations that govern our understanding of different sorts of thing. Perhaps some determinate tension in our practices of explanation will be brought to the surface through this approach, a tension that requires we revise something about what we are doing or supposing ourselves to be doing, and the philosopher may have a role to play in helping to shape that revision. But again this will be a process driven by particular features of actual situations, and so we must first be about the business of understanding these practices as they already take place.

### 2.2.7 A REMARK ON MODEL THEORY AND PROOF THEORY

Strictly speaking, this view is consistent with a model theory that makes use of essences or grounding relations to give truth conditions for sentences that use this vocabulary. But if we are minimalists about the truth-predicate such a view is not forced upon us, and I take it to be a virtue of this account that it can avoid ontological commitments by giving these vocabularies an exclusively proof-theoretic role. Perhaps talk of wholes and their parts, of objects and their singleton sets, or some other oddity will force us to impose more content on these kinds of claim. But at this point there is no need for a model-theoretic reliance on special relations of grounding or essence to explain why these claims are true; instead, they are seen as playing an expressive role in relating representations to one another in a space of explanation. Rather than turning to a model of grounding relations to give truth-conditions, we look to material facts concerning the objects in question (e.g. phosphorous and friction) to understand why the inference is a good one. And in point of fact there is little to be said for the suggestion, when we turn to our actual practices of explanation, that there is one picture of the world represented by a claim like ‘the whole exists *because* of the arrangement of the parts’ and ‘Socrates’ singleton set exists *because* Socra-

tes exists'. Still, nothing I have said here prevents the grounding theorist from modelling this talk with metaphysical relations. Either way, it is of interest that the proof theory can give a unified treatment of these locutions in terms of a material consequence relation without having to go in for the metaphysical machinery of a grounding or essentialist model theory. Though they play an important role in coordinating our practices of reasoning around a set of common object-language and metalinguistic commitments, we need not read terms like 'because', '*qua*', and 'in virtue of being' in a metaphysical register; instead, we interpret them in terms of the role they play in giving expression to prosaic commitments concerning determinate objects, properties, events, etc. as the specific things they are.

#### 2.2.8 LOOKING AHEAD

We are now in possession of an interconnected set of hypothesized explanatory tools concerning a handful of object-language intensional vocabularies, their apparently metaphysical import, and metalinguistic relations of proof and justification that hold among the object-language sentences in which these vocabularies are used. Our pre-existing practices of explanation can thereby be used as a guide for constructing a descriptive metaphysics. For the practice of constructing a consequence relation of the sort considered in this chapter is, by the analysis provided here, also a practice of determining what the object-language assertions that express different features of this consequence relation commit us to concerning the way the world is. In the next two chapters I will argue for subjunctive interpretations of the ontic modalities for possibility and necessity (chapter 3) and of the role of kind terms in explanation (chapter 4). On the basis of the current chapter's interpretation of the subjunctive conditional as both the expression of a rule of infer-

ence and a description of the space of possibility, the result will be that a variety of world-representing claims about kinds and their powers can be understood in terms of material inferential commitments concerning the uses of different modal operators and classes of kind term. This will prepare us for the inquiry into the subjunctive backgrounds of chemicals, organisms, and persons, the spaces of possibility that govern our understanding of these different kinds, that takes up the second half of the project.

### 3.0 A SUBJUNCTIVE INTERPRETATION OF THE ONTIC MODALITIES

*The modality of judgments is a quite special function of them, which is distinctive in that it contributes nothing to the content of the judgment...but rather concerns only the value of the copula in relation to thinking in general.*

Immanuel Kant, *Critique of Pure Reason*

In this chapter I show how to define the ontic modalities for necessity and possibility in terms of the subjunctive conditional. By the material inferential interpretation of the subjunctive conditional introduced in chapter 2, the result is a view on which talk of necessity and possibility is object-language talk for structural features of the material inferential frame within which ordinary language is meaningful. I take the following to be the criteria of adequacy for my proposal. First, to show how to define the strong and weak ontic modalities in terms of the subjunctive conditional, and to distinguish my view from Williamson's. This is satisfied in sections **3.1.1-3.1.3**. Second, I will show that Lewis' definition for the weak epistemic subjunctive 'might' cannot work for the weak ontic subjunctive 'could', and I will provide an alternative definition. This occurs in sections **3.2.1-3.2.2**. Appendices D and E accompany this chapter. The first shows that Williamson's definition for the weak ontic modality is equivalent to my own in a Lewisian possible worlds semantics (as will be seen in the main body, I have to impose additional restrictions for Williamson's definition to be equivalent to my own within the framework in-

troduced in chapter 2). Appendix E shows that a principle of inference that is habitually used in natural language is validated just in those cases where an **Import/Export** principle holds for the subjunctive conditional.

### 3.1 THE STRONG AND WEAK ONTIC MODALITIES

#### 3.1.1 INTRODUCING THE DEFINITIONS

With the interpretation of the subjunctive conditional as an object-language device for encoding inferential relations developed in chapter 2, we can understand object-language uses of the ontic modal operators for necessity and possibility as devices for quantifying over auxiliary hypotheses in reasoning, expressing commitment to some sentence being a derivation from every (for necessity) or some (possibility) further supposition (using lowercase Roman letters to range over sentences of the language):<sup>40</sup>

$$\Box\varphi =_{\text{def.}} (\forall p)(p > \varphi)$$

$$\Diamond\varphi =_{\text{def.}} (\exists p)(p > \varphi)$$

To put the point in the material mode, to say that  $\varphi$  is *necessary* is to say that  $\varphi$  would occur *no matter what*. Similarly, to say that  $\varphi$  is *possible* is to say that *there is* some event such that, were it to occur,  $\varphi$  would occur. On the material inferential interpretation of the subjunctive condi-

---

<sup>40</sup> Williamson (2007 p.159) proposes this definition for the strong ontic modality, though he defines the weak ontic modality as  $(\exists p)\sim(p > \sim\varphi)$ . I discuss the equivalence between these two definitions in **3.1.3** and appendix **D**.

tional, these claims about what must and could be are disguised talk of the goodness of derivations at every and some context.

### 3.1.2 ON THE DOMAIN OF QUANTIFICATION

A few remarks on the domain of quantification for these modalities is in order. First, the modal force of the box and the diamond will be determined by the domain of quantification. Nomological and metaphysical modalities will, for anyone who is not a scientific essentialist in the fashion of Alexander Bird (2007) and Brian Ellis (2001, 2002), range over different sets of sentences (more precisely, in the simplest case, the domain of the latter will be a proper subset of the domain of the former). And epistemic modality will in some cases have members that would not be present in the domain for *any* ontic modality, whether nomological or metaphysical. For if we read ‘might’ epistemically, then at a context where we do not know whether some metal is gold the claim ‘that metal might be gold’ will be true even if, as it happens, it is copper. But in such a context the claim that it is (ontically, really) possible for that very metal to be gold will be false (granting standard views about the identity conditions for elemental stuffs). That this is a difference in the domain of quantification can be seen from the fact that the first sentence will be true because there is a proposition—viz., ‘that metal is gold’—that is not ruled out by the relevant knowledge state. By contrast, the second sentence will be false because that proposition is *not* one of the world’s real possibilities, regardless of whether it is known or not.

There must also be restrictions on the domain of quantification. For if the language has negations for every sentence and the quantifiers range over every sentence of the language then to say that ‘ $\Box\phi$ ’ is true is, if the domain of quantification is unrestricted, to say that ‘ $\sim\phi > \phi$ ’ is

true. To put the point in the preferred language of the current project, to say ‘ $\phi$ ’ is necessary is to express commitment to there being a derivation of ‘ $\phi$ ’ from ‘ $\sim\phi$ ’. In some cases this is plausible. Williamson interprets the modality for metaphysical necessity in terms of the subjunctive supposition of a sentence’s negation leading to a contradiction:

$$\Box\phi =_{\text{def.}} \sim\phi > \perp$$

and on the classically valid principle that anything follows from a contradiction we get the result that when ‘ $\Box\phi$ ’ is true then ‘ $\phi$ ’ would be true even if it were to be the case that  $\sim\phi$ . Williamson motivates this definition by treating necessities as sentences that lead to a contradiction when we suppose they are false. But though there is some go to the thought that this works for logical or metaphysical necessity, it cannot work for nomological necessity.<sup>41</sup> For we reason under the subjunctive supposition of the negation of a nomologically necessary sentence while distinguishing sentences that can be derived under those suppositions from those that cannot. E.g., we distinguish the true counterfactual ‘if the proton’s mass were much greater than it is there would be no atoms’ from the false counterfactual ‘if the proton’s mass were much greater than it is then Philadelphia would be the capital of the United States’. But on Williamson’s account both sentences are consequences of the supposition in question if the supposition is the negation of a necessity. The result is that the domain of quantification for the analysis of necessary sentences must be restricted if we are to model nomological necessity with the subjunctive conditional. Similar problems plague the domain of quantification for the subjunctive interpretation of the weak ontic modality ‘possibly’. For if every sentence of the language is included in that domain

---

<sup>41</sup> Williamson (2007) is explicit that he is considering only metaphysical modality (pp.155ff).

then every sentence will be possible. Together these problems show that the domain of quantification cannot be the whole language (every sentence and its negation).

The solution proceeds in two steps. First we need to give a metalinguistic function sufficient to define assertibility conditions for these modalities. Second, we need to determine how to individuate that function. To begin, consider what the assertion of a necessity commits one to by way of reasoning. The claim that  $\varphi$  is necessary expresses in the object-language that at every further context of reasoning that could arise there will be a derivation of ' $\varphi$ '. And so in asserting ' $\Box\varphi$ ' one is committing oneself to there being a set of admissible revisions to the context, all of which have  $\varphi$  as a consequence. Define a function  $\mathbf{r}$  from sets of sentences in a language  $\mathbf{L}$  to sets of sets of sentences of  $\mathbf{L}$ :

$$\mathbf{r}: \mathcal{P}(\mathbf{L}) \mapsto \mathcal{P}(\mathcal{P}(\mathbf{L}))$$

where the elements of the first set are contexts of utterance and the elements of the second are sets of contexts of utterance that are *admissible revisions* of the members of the first set.<sup>42</sup> It is then possible to use the resources developed in chapter 2 to give an account of what one is doing, what commitments one is expressing, in using talk of necessity and possibility:

to say ' $\Box\varphi$ ' at  $\Gamma$  is to express commitment to the claim that every  $\Delta \in \mathbf{r}(\Gamma)$  is such that  $\Delta \vdash \varphi$

---

<sup>42</sup> Because we are dealing with material inferential relations and subjunctive conditionals it can happen that some elements of  $\mathbf{r}(\Gamma)$  are not proper supersets of  $\Gamma$ —for in the case of a properly counterfactual supposition, one must revise the context so as to delete those sentences that are incompatible with the supposition.



to say ‘ $\Diamond\varphi$ ’ at  $\Gamma$  is to express commitment to the claim that some  $\Delta \in \mathbf{r}(\Gamma)$  is such that  $\Delta \vdash \varphi$

Given the analysis of the subjunctive conditional as the expression of a rule of inference, the object-language use of the ontic modalities is hereby understood to express commitment to structural features of the subjunctive space of different facts, where talk of the *subjunctive space of facts* is in turn interpreted as an object-language means for talking about the *inferential space of sentences*.<sup>43</sup> To say that  $\varphi$  is necessary is to say that  $\varphi$  would obtain no matter what, and to say this is to *do* something with the language that is or involves expressing commitment to there being a derivation of  $\varphi$  from every admissible successive context. What this means is that we can now interpret the *object-language* use of the ontic modalities for necessity and possibility as ways of expressing commitment to structural features of the *metalinguistic* derivations that obtain at different contexts. In this way an understanding of the claim that  $\varphi$  is necessary is grounded in our practices of reasoning rather than in a theory of possibilities. This method for determining the assertibility conditions for object-language modalities is on all fours with a possible worlds analysis of their truth conditions, though here the primitive explanatory resource is a linguistic one, that of the *admissible revisions to a context*, rather than possible worlds. Finally, while I have focused on the nomological ontic modalities this account suffices to give truth conditions for other ontic modalities (e.g. metaphysical, logical, situational, etc.). Each modality will have its own revision function  $\mathbf{r}^*$ , and each function will determine the contexts that are  $*$ -admissible revisions, where ‘ $*$ ’ is replaced by logical, metaphysical, etc. modalities. And if we

---

<sup>43</sup> Together with the function  $\mathbf{f}$  determining the formal consequence relation, the function  $\mathbf{m}^i$  determining the material consequence relation, and the function  $\mathbf{u}$  determining the minimal revision to a context upon supposition of a new sentence (see footnote 32), the class of consequence relations considered in this work are represented by quadruples:  $\langle \mathbf{f}, \mathbf{m}^i, \mathbf{u}, \mathbf{r} \rangle$ . It may of course be that these functions are defined semantically; the point here is simply to indicate their role in the proof-system of the consequence relations they define.

adopt the *qua* locution discussed in 2.2.5 and 2.2.6 as a device for giving object-language expression to material rules of inference, then the range of quantification for an ontic modality can be specified in the object-language with such claims as ‘*qua* particle in the actual world nothing travels faster than light, but *qua* what is logically conceivable it is possible that some particles travel faster than light’.<sup>44</sup>

In giving this analysis I relied on a metalinguistic stipulation of the function **r**. To get a specification of that function, and so to determine in practice which sentences of the language are quantified over as auxiliary premises in reasoning with the nomological modalities at various contexts, one needs to take up first-order inquiry into the world, its objects, and their properties. For to determine which sets are admissible revisions to a context, and so to determine what is possible and necessary among objects and their relations, is to determine what to think about the world. This is a project for the special sciences rather than the philosopher. The expressivist can interpret object-language modalities as devices for guiding our reasoning, but specifications of the reasoning governing our understanding concerning what various kinds of objects can and cannot do is beholden to the results of research into the kinds of objects we are talking about. This is not a philosophical task, nor is it one that says much about the *metaphysics* of objects in any sense more substantial than what science tells us about, e.g., what it is to be a salt crystal or an oak tree. To the extent that this is a metaphysical project, it is one that proceeds by making explicit the explanatory structure within which ordinary inquiry proceeds. And this is a descriptive project, so that if there are prescriptive suggestions to be made they must come as the result of a discovery of some specific need to revise our understanding of things. Let the physicists and

---

<sup>44</sup> I hope it is clear both that the details of the example do not matter, and that nothing I have said commits me to actually discriminating a difference between, e.g., metaphysical and logical modalities. The point is only that this account allows for such a discrimination for anyone so inclined.

botanists tell us what we ought to think about the world—the *metaphysicist* brings this explanatory practice to semantic self-consciousness by telling us what we are *doing* in going in for these sorts of explanations. Namely, we are making explicit the inferential space within which we reason about different individuals, thereby making that inferential space itself the subject of debate. In this way talk of the space of *possibility* that delineates an object as the determinate object it is can be interpreted as an object-language expression for talk about the space of *reasoning* that governs our understanding of the object.

### 3.1.3 ON THE NEGATION EQUIVALENCE BETWEEN THE STRONG AND WEAK ONTIC MODALITIES

If we adopt the standard equivalence between the weak and the strong ontic modals:

$$\Diamond\varphi =_{\text{def}} \sim\Box\sim\varphi$$

then ‘ $\Diamond\varphi$ ’ would be rendered, not as above, but instead as:

$$\sim(\forall p)(p > \sim\varphi)$$

Given the standard equivalence between the universal and existential quantifiers, this becomes:

$$(\exists p)\sim(p > \sim\varphi)$$

After defining the strong ontic modal in the way I have here, Williamson (2007 p.159) offers this definition for the weak ontic modal. To say that  $\phi$  is possible, on this analysis, is to say that there is some  $p$  such that it is not the case that, were  $p$  to obtain, ' $\sim\phi$ ' would obtain. And this is not obviously to say the same thing as saying that there is some  $p$  such that were it to obtain  $\phi$  would obtain. Furthermore, Lewis (1973) defines the weak subjunctive 'if  $\phi$  were to be the case then  $\psi$  might be the case' as ' $\sim(\phi > \sim\psi)$ ', so it would seem that these two definitions are in conflict.

But ' $(\exists p)\sim(p > \sim\phi)$ ' is equivalent to ' $(\exists p)(p > \phi)$ ' even in a Lewisian frame, and so in this context Williamson's definition for the weak ontic modal is equivalent to my own (see appendix **D** for a proof). In my context, however, a further stipulation is required. For nothing so far said rules out the possibility that at a context  $\Gamma$  there is some sentence  $p$  such that it is not the case that were it added to  $\Gamma$  then  $\sim\phi$  would be implied (' $(\exists p)\sim(p > \sim\phi)$ '), while it is *not* the case that there is a sentence  $p^*$  such that  $\phi$  would be implied if  $p^*$  were added to  $\Gamma$  (' $(\exists p^*)(p^* > \phi)$ ').<sup>45</sup> This is a problem of the paucity of the auxiliary hypotheses available at a context, and to ensure the equivalence it is necessary that the domain of quantification for the modals be such that for any context, any  $p$ , and any  $\phi$ , if  $p$  together with that context does not imply  $\sim\phi$  then there is some  $p^*$  that when added to that context does imply  $\phi$ .

---

<sup>45</sup> The other direction will go through for coherent  $\Gamma$ .

## 3.2 THE WEAK ONTIC SUBJUNCTIVE CONDITIONAL

### 3.2.1 LEWIS' DEFINITION

In *Counterfactuals* Lewis defines the weak subjunctive 'if  $\phi$  were to be the case then  $\psi$  might be the case' as follows:

Might:  $\phi >_m \psi =_{\text{def.}} \sim(\phi > \sim\psi)$

One way of assessing the tenability of this definition is to see whether there are occasions where the following is felicitous:

1)  $(\phi >_m \psi) \ \& \ (\phi > \sim\psi)$

As the second conjunct contradicts Lewis' definition of ' $>_m$ ', the presence of felicitous utterances of this form will tell against this definition. But even among those who disagree with Lewis, it tends to be accepted that (1) is infelicitous. Hannikainen (2011), following DeRose (1991, 1999), holds that such utterances are "invariably unassertible" (p.138) without a context shift of some sort.<sup>46</sup> And though Bennett (2003) rejects Lewis' definition of the 'might' counterfactual, instead preferring to think of ' $\phi >_m \psi$ ' in terms of the standard counterfactual operator and a weak ontic modal on the consequent (' $\phi > \Diamond\psi$ '), he nevertheless thinks that the latter will be true

---

<sup>46</sup> He also thinks that exploratory uses do not require a context shift, though it is not clear to me what such uses are supposed to involve.

just in case ' $\sim(\phi > \sim\psi)$ ' is true (pp.191-2). Williams (2010) supposes that while *contra* Lewis the two conjuncts of (1) can be jointly true, the infelicity of asserting both is a matter of their pragmatics (p. 656). Toward the end of his paper Williams notes that none of his arguments against the equivalence between ' $\phi >_m \psi$ ' and ' $\sim(\phi > \sim\psi)$ ' conclusively refutes that analysis, and instead suggests that the burden has been shifted onto those who would maintain such an analysis in the face of his arguments. By showing that there are weak counterfactuals that admit felicitously assertible instances of (1), without a hint of pragmatic inconsistency, I will in what follows aim to give such a refutation (at least for that class of weak counterfactuals under consideration).

### 3.2.2 'MIGHT' AND 'COULD'

When given an epistemic reading ' $\phi >_m \psi$ ' does have the ring of equivalence with ' $\sim(\phi > \sim\psi)$ '. For in saying that  $\psi$  might happen conditional on the supposition that  $\phi$ , where this is interpreted as expressing a claim to the effect that the relevant knowledge base does not rule out the occurrence of  $\psi$ , one seems to be saying that it is *not* the case that the occurrence of  $\phi$  is such that it would entail the nonoccurrence of  $\psi$ . But the current project is resolutely ontic in its interpretation of what talk of necessity and possibility expresses, not epistemic, and counterfactual claims using 'could' in the consequent are often used to express commitments concerning the capacities of the objects referred to in such claims. And when 'could' is our target weak subjunctive, counterexamples to this equivalence abound. I will represent these counterfactuals as ' $(\phi >_c \psi)$ '. To my knowledge, 'could' subjunctives have not been the subject of discussion, but they clearly

admit of instances contradicting Lewis' definition of the 'might' subjunctive. Consider the following:

- 2) If the Republicans were to raise the debt ceiling, Obama could fund the Pentagon's next big project, but if the Republicans were to raise the debt ceiling Obama would not fund the Pentagon's next big project.

The context is that without additional borrowing, there is no way for the Pentagon's next big project to be funded, but that as it happens the funding of social security entitlements is perceived by all (and known to be perceived by all) as far more important, and funding both programs is not possible even were the debt ceiling to be raised. The raising of the debt ceiling gives Obama a capacity to fund the Pentagon's project that he otherwise would not have, and for this reason the first conjunct is assertible. But as it happens that capacity would not be actualized, for something else is more important. Nor does it seem like any context-shifting occurs when evaluating these two conjuncts. In knowing that the raising of the debt ceiling suffices to afford Obama the capacity to fund the Pentagon's next big project we are not yet given any information that settles whether, as it happens, that capacity *would be actualized* simply because it was made available. And so the second conjunct is compatible with the first even in the same context of assertion.

Next, consider a situation in which you and I are in the process of moving your belongings. Suppose you are driving the moving van, and for part of the trip we travel down a dirt road. At one point you swerve to miss a large hole. Suppose there are some cups that are currently wrapped in packing paper, but that were for a time (prior to the drive) left loose in a bin. Finally, suppose that i) if you had hit the hole then, so long as the cups were (as they are) wrapped in packing paper, they would not have shattered; ii) had the cups been left in the bin

then they would not have shattered if you swerved to miss the hole; and iii) if they had been left in the bin then if you had hit the hole they would have shattered. In such a situation it would be correct to say:

- 3) If the cups had been left in the bin, they could have shattered, though as it happens if the cups had been left in the bin they would not have shattered.

*As it happens*, for you swerved to miss the bump, and so in the closest world in which the cups were left in the bin they do not shatter. And yet, had they been left in the bin then, had you hit the bump, they would have shattered, and so it is correct to say that they *could* have shattered if left in the bin.

These examples do not turn on the capacities of agents, as can be seen by considering other cases. Suppose a context in which Amy is in charge of installing a transformer for a building and her employee Bill has gone home without installing the lightning rod at the roof of the building. A storm is coming through that night, and Amy stays behind to install the lightning rod. As it happens, no lightning strike hits the building, and both people are aware of this. The next morning Amy says to Bill:

- 4) If the lightning rod had not been installed, the transformer could have been fried.

Nevertheless, it is true that:

- 5) If the lightning rod had not been installed then the transformer would not have been fried.

However, suppose that in response to Amy's assertion of (4) Bill points out that there were no lightning strikes that hit the building and asserts (5). Bill would now be subject to criticism by Amy—not because what Bill says is false, or because it is incompatible with what she said. Instead, what Bill says misses the point. The fact that, as it happens, the transformer *would* not



have been fried does not suffice to rule out that it *could not* have been fried: ‘ $(\phi >_c \psi)$ ’ is compatible with ‘ $(\phi > \sim\psi)$ ’. If one is a determinist, then what could not have happened, given how things were, is that there would have been a lightning strike. But nevertheless, the transformer could have been fried—for if there *had* been a strike it *would* have been fried. And so the ontic ‘could’ counterfactual ‘ $\phi >_c \psi$ ’ is compatible with the standard ‘would’ counterfactual ‘ $\phi > \sim\psi$ ’. This shows that Lewis’ definition (Might) is unfit for this weak subjunctive.

This does not yet tell us how to interpret ‘ $\phi >_c \psi$ ’, however. Before looking at such an interpretation, consider one last argument against the current applicability of Lewis’ definition of the weak subjunctive. In particular, consider how a Lewisian might translate:

- 6) If the lightning rod were installed, the transformer could not be fried.

The introduction of the negation into this sentence makes a straightforward Lewisian translation difficult to come by. If we represent ‘the lightning rod is installed’ by ‘ $\phi$ ’ and ‘the transformer is fried’ by ‘ $\psi$ ’ then a few candidates present themselves:

- 7)  $(\phi >_c \sim\psi)$
- 8)  $\sim(\phi >_c \psi)$
- 9)  $\sim\Diamond(\phi >_c \psi)$
- 10)  $(\phi >_c \sim\Diamond\psi)$

(7) is clearly wrong, as this merely says the non-frying of the transformer is a possibility, whereas (6) says that its non-frying is necessary. (8) will not work because on Lewis’ definition this is equivalent to ‘ $(\phi > \sim\psi)$ ’. But (6) says something stronger than the claim that if the lightning rod were installed it *would* not be fried—(6) says that it would not be possible. And so we seem to need an explicitly modal formulation as in (9) or (10). But (6) introduced a negation, not a mod-

al operator. This being so, it would seem that the modality of (6) was already present in the ‘could’ formulation as it stands.

This provides a clue as to how to interpret ‘ $\phi >_c \psi$ ’. Notice that the ‘could’ portions of our respective pairs of sentences can be translated (some more naturally than others) as ‘would be able’:

2’) If the Republicans were to raise the debt ceiling, Obama would be able to fund the Pentagon’s next big project.

3’) If the cups had been left in the bin, they would have been able to shatter.

4’) If the lightning rod had not been installed, the transformer would have been able to be fried.

6’) If the lightning rod were installed, the transformer would not be able to be fried.

Talk of the *abilities* of the individuals in question gives voice to the thought that the subjunctive ‘could’ is ontic, a device for marking the powers or capacities of objects.

These uses of the strong subjunctive ‘would’ and a modalized consequent suggests a translation of ‘ $\phi >_c \psi$ ’, as ‘ $\phi > \Diamond \psi$ ’ which becomes:

$$11) \phi > (\exists p)(p > \psi)$$

To say that the cups could have shattered had you left them in the bin is, on this account, to say that had the cups been left in the bin then there would be some  $p$  such that, had it obtained, the cups would have shattered. In our discussion of that case we know exactly which  $p$  to specify—namely, hitting the hole that (as it happens) you swerved to miss. And if one goes back to read the closing sentence of the paragraph that introduces the cups case, it will be seen that such an embedded subjunctive was used to give voice to this explanation (‘had they been left in the bin then, had you hit the bump, they would have shattered’). This reinforces *both* the subjunctive

interpretation of the ontic modalities, *and* the modal interpretation of the weak ontic subjunctive, as features of our language implicit in our habits of explanation (and so this whole constellation of ideas supports the supposition that by attention to our practices of reasoning we can read off some of our most basic commitments). Similarly, the  $p$  in question in the lightning rod case is the lightning strike that, as it happens, did not occur—but had it, in a condition where the lightning rod had not been installed, the transformer would have been fried. And so the ‘could’ subjunctive goes over into the ‘would be possible’ subjunctive.<sup>47</sup>

### 3.2.3 SUMMING UP AND LOOKING AHEAD

On the line of thought developed above the ontic modalities can be interpreted as devices for articulating *general* features that give the identity conditions for objects and their kinds, just as subjunctive conditionals can be used to articulate *specific* features of objects and their kinds. This is a form of expressivism in that the antecedents of the subjunctive conditionals implicated by the use of a ‘necessity’ operator are interpreted as auxiliary premises in inferences to some proposition  $\phi$ . To say that  $\phi$  would obtain no matter what is to give a material mode formulation whose formal mode correlate is the expression of a rule, given in the quantification over the antecedents of subjunctive conditionals, that one can infer  $\phi$  from any set of premises. The role that a modal operator has in characterizing what is necessary about the world is a role that, on

---

<sup>47</sup> This rendering also has the advantage of supporting Hannikainen’s contention that there is some kind of shift undertaken when we move from a ‘would’ counterfactual to the corresponding ‘could’, but without thinking of the shift as an equivocation. Instead, it is built directly into the semantics of the ‘could’ subjunctive. For when evaluating ‘ $(\phi > \sim\psi)$ ’ we look at whether ‘ $\sim\psi$ ’ holds at all the nearest  $\phi$ -worlds. But when evaluating ‘ $(\phi > \Diamond\psi)$ ’ we look at whether  $\psi$  holds at all the nearest ‘ $\phi \& p$ ’ worlds, for some  $p$ . And given the failure of antecedent strengthening characteristic of the subjunctive conditional, it is straightforward that the nearest  $\phi$ -worlds can be  $\psi$ -worlds while the nearest ‘ $\phi \& p$ ’-worlds can be ‘ $\sim\psi$ ’-worlds.

this analysis, is understood in terms of the *use* that the modal operators play in implicating sets of premises from which to reason about the world. The foregoing discussion has equipped us with a method in metaphysics: we shall entitle our use of modal operators, and so demystify the existence of the modal facts they purport to represent, by interpreting those operators in terms of patterns of subjunctive conditionals, which in turn specify the identity conditions of different kinds of individuals. So long as we countenance the humdrum facts that subjunctive conditionals express our commitment to, we will be in a position to countenance the structure to this subjunctive background that modal talk gives expression to.

## 4.0 A SUBJUNCTIVE INTERPRETATION OF KIND TERMS

*Although describing and explaining (predicting, retrodicting, understanding) are distinguishable, they are also, in an important sense, inseparable. It is only because the expressions in terms of which we describe objects, even such basic expressions as words for perceptible characteristics of molar objects, locate these objects in a space of implications, that they describe at all, rather than merely label. The descriptive and explanatory resources of language advance hand in hand.*

Wilfrid Sellars, “Counterfactuals, Dispositions, and the Causal Modalities”

This chapter takes up the interpretation of the subjunctive conditional and the ontic modalities arrived at in the last two chapters so as to give an account of the inferential role of kind terms. By associating with each kind term a set of inferences to and from the use of that kind term in explanations (material inferential introduction and elimination, or Right and Left Rules), the object-language uses of the subjunctive conditional in articulating the putatively metaphysical contour—the space of possibility—surrounding the members of a kind can be understood in terms of the material rules of inference that govern the use of the corresponding kind term. The ontic modal operators for necessity and possibility articulate the large scale structure of this material inferential space. Together these resources—the material inferential interpretation of the subjunctive conditional, the subjunctive interpretation of the ontic modalities, and the material infer-

ential interpretation of kind terms—will constitute the conceptual machinery with which to consider questions about the metaphysics of kinds. For the subjunctive space of different kinds (to put the point in the object-language) can be read off the material inferential introduction and elimination rules for different kind terms.

I set three criteria of adequacy for this chapter. First, I will show how to extend the material inferential framework of the second chapter so as to consider the role that kind terms play in justifying different inferences. This is accomplished in sections **4.1.2** and **4.1.3**. Second, I will show that this account is able to specify the criteria of identity and individuation that are associated with kind terms. This desideratum is more involved, and it takes the bulk of **4.2** to accomplish it. In this way the modal expressivism developed in the first half of the dissertation makes possible an investigation into the metaphysics of kinds that is taken up in the second half. This last criterion of adequacy is discussed in section **4.2.4**. In **4.2.5** I summarize the discussion as a preparation for the metaphysics of kinds that will take place in the remaining chapters of the dissertation.

## 4.1 ON THE COMPREHENSION OF KIND TERMS

### 4.1.1 MODALITY AS REPRESENTING THE WORLD AND AS GUIDING OUR REASONING

I want to begin by considering an argument at the center of Sellars' "Counterfactuals, Dispositions, and the Causal Modalities" (1958). In that paper Sellars argues that for the use of a term in a declarative sentence at a context to count as a description of the world it must be the case that

such a use occurs in a linguistic framework that specifies (at least partially) what the use of that term at that context implies and rules out. If a term's use is not situated in this inferential space then it can only be used to label the world in a certain way; one is not meaningfully describing it. The argument for the explanatory insufficiency of representational theories of meaning, and of the correlate need to bear the inferential relations of a language in mind when thinking about what it is for some bit of that language to be meaningful, proceeds by way of an observation that for a term in use to be meaningful it cannot be enough that the term stands in some mapping onto an object (or set of objects, or function from objects to objects, etc.) in the world. Instead, a term in use at some context is meaningful as a description of the world only if that use is deployed in such a way that its user could give reasons for her claim and explain the state of affairs described. Without a grasp of those explanatory relations, a grasp exhibited in one's inferential facility with the content being asserted, one quite literally does not understand what one is saying. To explain some fact is to be able to give reasons for its obtaining, so that to be able to specify an explanation for some fact *p* is to be able to specify, at least partially, what implies *p* and what *p* in turn implies and rules out. That the explanatory and descriptive resources of language *use* go hand in hand entails that any theory of the *meaning* of language must give due regard to this fact, at the cost of distorting our conception of what it is to be a natural language. As Sellars puts the point (1958, §108, emphasis in the original):

Although describing and explaining (predicting, retrodicting, understanding) are *distinguishable*, they are also, in an important sense, *inseparable*. It is only because the expressions in terms of which we describe objects, even such basic expressions as words for perceptible characteristics of molar objects, locate these objects in a space

of implications, that they describe at all, rather than merely label. The descriptive and explanatory resources of language advance hand in hand.

This is an idea that Brandom has developed in various places—cf. chapters 4 and 5 of (2008) and chapter 1, §4 of (2014). From the latter:

All descriptive predicates have subjunctively robust consequences because, as Sellars says, being located in a space of such explanation-supporting implications is just what distinguishes *descriptions* from mere labels. Describing something in the actual situation *always* involves substantial commitments as to how it *would* behave, or what else *would* be true of it, in other *possible* situations.

As discussed in section 5 of the Introduction, Peirce also came around to thinking that grasp of an individual object turned on grasp of the subjunctive space in which it was located, and he thought that the role of these ‘would-be’s was broad enough to do substantive work in thinking about both brute mechanical and properly cognitive activities. In a margin note (*circa* 1910) on a copy of the 1878 paper “On the Doctrine of Chances” Peirce wrote (1910, p.169; emphasis in the original):

The statement [concerning the throw of a die] means that the die has a certain “would-be”; and to say that a die has a “would-be” is to say that it has a property, quite analogous to any *habit* that a man might have. Only the “would-be” of the die is presumably much simpler and more definite than the man’s habit as the die’s homogenous composition and cubical shape is simpler than the nature of the man’s nervous system and soul; and just as it would be necessary, in order to define a man’s habit, to describe how it would lead him to behave and upon what sort of occasion—albeit this statement would by no means imply that the habit *consists* in that action—



so to define the die's "would-be", it is necessary to say how it would lead the die to behave on an occasion that would bring out the full consequence of the "would-be"; and this statement will not of itself imply that the "would-be" of the die *consists* in such behavior.

Peirce, Sellars, and Brandom can each be seen as emphasizing the centrality of subjunctive reasoning, placing an object in a space of possibility, as a condition on grasp of that object as a determinate particular. It will be this idea that I develop in the current chapter, and I do so by extending the material inferential interpretation of the subjunctive conditional so as to consider the role of kind terms in our explanatory practices. In the final section (4.2.5) I will use this idea, as developed in the intervening pages, to transition from the modal expressivism that has been underway for the last three chapters to the descriptive metaphysics of kinds that will occupy the next three chapters.

#### 4.1.2 FROM TRUTH IN A MODEL TO PROOF IN A LANGUAGE: CIRCUMSTANCES AND CONSEQUENCES OF APPLICATION

According to a representationalist picture of language the semantic role of modal operators is to shift the context of evaluation away from the context of utterance so as to evaluate the truth of the modalized sentence at these other contexts. In this way modalized sentences acquire a definite semantic interpretation—given a semantic value for sentences at the different contexts in which they can be uttered and assessed, the semantic value of modal sentences will be systematically fixed as well. This approach is analogous to the method of using truth tables to specify the semantics of logical operators—indeed, it is an abstraction of that method ‘up’ a level in the set-

theoretic hierarchy of extensions.<sup>48</sup> On such a view the logical operators are given an interpretation according to the way in which they systematically yield a semantic value for output sentences according to the semantic values of input sentences—they are functions from truth values to truth values.

The model-theoretic interpretation of the logical operators is straightforward for nonmodal operators. The model theory for the semantics of nonmodal propositional logic requires only that we fix the truth value of all of the atomic sentences and stipulate truth-tables for every connective. The necessity and possibility operators are not in this sense truth-functional. We need to know more than the truth-value of  $p$  to calculate the truth-value of  $\Box p$ . But with a possible worlds interpretation of the modal operators the only thing we need to know in order to calculate the truth value of a modal sentence is the truth value of the input sentence *at the relevant possible worlds*.<sup>49</sup> The possible worlds approach to modal operators is thus a straightforward extension of the model theory for the extensional connectives. Notice also that the ontological problems associated with a declarative/representational grammar are brought into sharp relief with the possible worlds semantics.

In the last two chapters I have argued for an inferentialist interpretation of the subjunctive conditional and the ontic modalities that is founded on analogy with a proof-theoretic alternative to the model-theoretic approach toward formal systems. Here the explanatory framework is one of introduction and elimination rules governing the use of logical operators rather than truth tables, and the modal terms are interpreted by adding more proof-theoretic structure rather than

---

<sup>48</sup> It is for this reason that the term ‘intensional semantics’ is a bit of a misnomer; modal logic is nothing like a logic of intensionality in the original sense of the term.

<sup>49</sup> So much is true of modal propositional logic; the problems of substitution and the specification of a domain for *quantified* modal logic require more developed theorizing.

additional model-theoretic features. Generalizing from logical to non-logical content we can shift from talk about the introduction and elimination rules for the logical operators to the circumstances and consequences of application of atomic sentences understood as material rules of inference. Now the contrast between model-theoretic and proof-theoretic approaches toward logic and language is drawn more starkly. On the one side we have sentences interpreted by truth values, logical content interpreted truth-functionally, subsentential content determined denotationally, and with a model theory comprised of extensions across possible worlds; on the other side we have sentences, logical operators, and subsentential content interpreted via their roles in inference. Instead of interpreting the language via a model theory of extensions, the metalanguage is one of inferential relations; contexts are interpreted not as possible (perhaps partial) worlds, but instead as sets of collateral premises that, given the underlying material inferential relations of the metalanguage, imply and rule out various other sentences. In chapter 2 (2.1.3, 2.2.5, and 2.2.6) I showed how to give additional structure to the circumstances and consequences of application that are associated with each sentence, and I argued that we could then use that structure to both make more fine-grained distinction content or relevance and to explain the roles of new object-language vocabulary. The use of explanatory phrases like ‘because’ in ‘if the glass were to drop it would break, because it was dropped’ can be understood to give expression to the fact that the inference from ‘the glass is dropped’ to ‘the glass breaks’ is underwritten by a connection between those two contents that is encoded in the material inferences of the calculus under consideration. By supposing that the proof-theory is such that the material rules of inference are given this additional structure, grouped according to circumstances and consequences associated with specific sentences, we can thereby come to understand these explanatory phrases as devices for expressing commitment to that structure. And in this regard these explan-

atory phrases can be understood without need to inflate a model with new representational interpretations—they play a purely pragmatic role.

There little doubt that object-language expressions of this sort have long interested philosophers. From the confines of a tradition centered in analytic philosophy, recent investigations into the metaphysical implications of these explanatory modal operators can seem like a new development. But similar concerns were at work in the analyses of reduplicative expressions that emerged from late medieval attempts to extend Aristotelian syllogism to cover different forms of judgment (Bäck 1996 discusses reduplicative logic in detail, and at pp.483-99 he looks at then-contemporary work making use of *qua* expressions). The rest of this chapter employs the inferentialism developed in chapters 2 and 3, together with the more general proof-theoretic methodology outlined above, so as show how to understand kind terms via their roles in inference as marked by the use of reduplicative expressions like ‘*qua*’ and ‘in virtue of being’. In the next section I introduce the notion of comprehension of a kind term at a context as the material introduction and elimination rules for that kind term at that context. I then show how to account for the criteria of identity and individuation associated with a kind term. This will give us a view on which kind terms are, like modal operators, object-language devices for encoding structural features concerning the inferences that govern the use of various terms, where talk of the truth of these object-language sentences gives expression to our comprehension concerning what it means to be various kinds of objects.

#### 4.1.3 A MATERIAL INFERENTIAL INTERPRETATION OF KIND TERMS—MEDIATING THE SINGULAR WITH UNIVERSALITY<sup>50</sup>

The non-monotonic material consequence relation outlined in chapter 2 offers a way of making precise the thought that a kind term has circumstances and consequences of application. It will be remembered that in **2.1.3** each sentence of the language was associated with context-specific left and right rules, or consequences and circumstances of application:

##### **Circumstances of Application of $\phi$**

$\phi R^1$ :  $\Gamma \vdash_m \phi$

$\phi R^2$ :  $\Delta \vdash_m \phi$

.

.

.

##### **Consequences of Application of $\phi$**

$\phi L^1$ :  $E, \phi \vdash_m \psi$

$\phi L^2$ :  $E, \phi \vdash_m \chi$

.

.

.

---

<sup>50</sup> The material discussed here has been influenced by my reading of Hegel and Peirce on syllogistic inference—see my (Forthcoming c).

$\phi L^{n+1}: Z, \phi \vdash_m \tau$

$\phi L^{n+2}: Z, \phi \vdash_m v$

.

.

.

Just as in the case of model-theoretic approaches toward modality, the addition of complexity in the metalanguage affords a greater range of discriminatory power concerning the evaluations that can be made of different object-language sentences. With rules of inference associated with particular sentences we can begin to make sense of some of the object-language explanatory terms we use to justify why different subjunctives are true. The sentence ‘if there were a bug on the wall and the match were struck, it would light’ may be true in some situation, and for we who accept this as true our idiolects will license a corresponding derivation of the consequent from the context arrived at upon supposition of the antecedent (according to the account given in chapter 2). But presumably it is also true that if there were a bug on the wall and the match was struck it would light *because* it was struck, not because a bug was on the wall. If, in a toy language governed by a consequence relation of the sort considered in chapter 2, the corresponding derivation is one that is underwritten by a rule that is associated with ‘the match is struck’—that is, if ‘the match is lit’ is one of the consequences of application of ‘the match is struck’ rather than ‘a bug is on the wall’—then we can interpret the object-language sentence ‘if there were a bug on the wall and the match were struck then it would light, because it was struck’ as a means of expressing commitment to that rule of inference. But this means that we can, in our language,

consider the use of such sentences as means for guiding others in the use of different terms. And because ‘because’ locutions need not import any representational commitment beyond that which is spelled out in marshalling ordinary first-order representational claims as justification for the rule (cf. **2.2.5** and **2.2.6**)—in this case, talk of phosphorus and flammability—the material inferential expressivist need not suppose that use of ‘because’ in the object-language requires any additional model-theoretic structure. While we might say, in the object-language, that the derivation encoded by such an explanation is underwritten by laws of nature or causal relations, to say *that* is (according to the discussion of chapter 3) to say nothing more than that the derivation in question remains good upon supposition of any premise consistent with a set of sentences that first-order inquiry has settled as admissible descriptions of (some portion of) the universe. In the case of an explanatory relation like that between Socrates and his singleton set, there may be nothing more to say in defense of the fact that Socrates’ singleton set exists because Socrates exists, rather than vice versa, other than that the term ‘set’ has a certain use in the language. We might eschew talk of use by going in for talk of what it ‘means to be’ a set, and try to convince our interlocutor that it is no part of what it means to be Socrates that his singleton set exists, while it *is* part of what it means to be a set that its member exists, but on the current approach terms like ‘what it means to be’ and ‘because’ play a *pragmatic* role in giving object-language expression to structural features of the proof system. Any explanation as to why such a claim is warranted is to be spelled out by reference to facts concerning the objects referred to in the sentences on which the claim operates. When it comes to giving a model for these terms, we need posit nothing more than the linguistic items that are used by the language in question. There is no need to lay a domain of ‘causes’ or ‘essences’ alongside the domain of, e.g., matches and ox-

ygen. Only talk of the latter variety requires we expand our ontology—talk of the former can be rendered as disguised talk about language itself.<sup>51</sup>

Right and left rules, or circumstances and consequences of application, can also be provided for kind terms. Call the set of left and right rules for a kind term *K* the *comprehension of K*. To be given the comprehension of a kind term is to be given its role in inference, its material inferential significance. Once again this additional structure permits additional explanatory power concerning object-language vocabulary. Reduplicative terms like ‘*qua*’ and ‘in virtue of being’ can be understood as expressing commitment to this more fine-grained individuation of material rules of inference in terms of the subsentential content of sentences. Use of these terms in the object-language enables us to interpose classification of an individual between reference to it and attribution of a property, thereby expressing that the attribution holds in virtue of the classification. ‘The match, *qua* match (or, e.g., in virtue of being coated in phosphorus), would light if struck’ can be understood as expressing commitment to the fact that lighting when struck is part of the material rules of inference that govern our understanding of (govern what it means to be) a match. And just as this proof-theoretic expressivist understanding of the role of ‘because’ requires no additional representational commitments beyond what is used in spelling out why matches light when struck (2.2.6), so the use of these reduplicative ‘*qua*’ expressions presuppose no further representational commitments. They, like ‘because’, play a purely pragmatic role—whatever representational work is done in their use is done by material facts concerning, e.g., phosphorus, friction, and flame.

---

<sup>51</sup> In a fuller exposition of this idea, reference to Carnap (1934)’s discussion of the material and formal modes of discourse would be needed. I refer the reader to 1.1.2 for some discussion of Carnap and his influence on the line of thinking developed here.



On the current approach the introduction of this object-language vocabulary has the function of expressing commitment to rational connections among the sentences of the language that obtain in virtue of conditions of relevance, and this fact helps contrast the current approach with more conventional contemporary programs in logic and metaphysics. It will be recalled from the discussion of the introduction that despite the 20<sup>th</sup> century focus on truth-functional interpretations of logic, spelled out via extensions, there have historically been interests in material inferential relations as a complement to extensional truth-functionalism, from medieval distinctions between material and formal consequences, to 17<sup>th</sup> and 18<sup>th</sup> century debates about whether logic is content-neutral, to 19<sup>th</sup> century debates about whether logic admits of non-deductive inference, and into Frege's conviction (from §5 of the *Begriffsschrift*) that the assertion of a conditional has its ground (*Grund*) in a causal connection (*ursächliche Verknüpfung*) of some sort that logic abstracts away from, Reichenbach's allowance that logical operators in natural language have a 'connective' reading that turns on some non-logical (that is, non-truth-functional) connection between their contents that the logician should ignore, and attempts to formalize relevance connections in the work of people like Anderson, Belnap, and Dunn. Recent interest in metaphysical grounding can be seen as an attempt to give a formal treatment of these non-truth-functional connections. So far that treatment has focused on extensional analyses that posit additional model-theoretic structure, in the form of essences or special metaphysical relations, that are given a representational interpretation. But the expressivism under development here makes use of the old contrast between extension and comprehension to offer a non-representational account of the role of terms like 'because' and '*qua*', and for this reason it marks a more radical return to non-extensional interests in logic and metaphysics. My employment of the term 'comprehension' for this treatment of grounding explanations is meant to signal this break. Rather than sup-

posing that all language has the role of representing objects and properties, so that the interpretation of a language proceeds by way of extensions (or functions of extensions) the material inferential expressivist urges us to see that there are two interconnected roles that most language in context performs—one serves to refer to and represent the world, another serves to implicate conceptual relations among the terms of the language. And the latter is not to be reduced to (or interpreted as functions of) the former. The representationalist supposes that the addition of new object-language vocabulary is to be handled by enriching the model-theory with additional objects and properties. By contrast I have enriched the material inferential structure of the second chapter with additional proof-theoretic resources, subdividing the material rules of inference by associating them with particular sentences and kind terms, in order to explain the object-language role of grounding terms like ‘*qua*’ and ‘in virtue of’ as devices for marking the comprehensional rather than extensional dimension of language. In this way the material inferential expressivism under development here proposes to interlace the representational and expressive, extensional and comprehensional, dimensions of language. By making a claim like ‘the match, *qua* coated in phosphorus (in virtue of being dry, etc.) would light if struck’ one is wedding the representational side of language, referring to matches and attributing properties to them, with the inferential. Now reference to individuals and attribution to them of properties (representation) can be carried out by recourse to *classification* of those individuals under categories that specify some *relevant connection* between the individuals and the attributed properties, a classification that has the function of explaining why the object referred to would exhibit the property in question: it is because the match is coated in phosphorus that it would light if struck. And in employing this additional proof-theoretic resource to make sense of new object-language vocabulary we need not suppose that there is anything metaphysically spooky invoked by terms like

‘because’ and ‘*qua*’. The role of such terms is to express a relevant connection, a material inferential relation, between the terms of the language. They do not import any additional representational structure beyond that which we are committed to by representing the world in the ways that we do with the sentences on which those terms operate: their function lies with the comprehensional side of language, not the extensional. Any questions concerning why a given grounding explanation is warranted or true is to be spelled out by recourse to representational facts about the sentences and terms on which they operate. We look to first-order inquiry into phosphorus and oxygen in order to explain why a match, *qua* coated in phosphorous, would light if struck. The use of that *qua* operator serves to express a relevant connection, but the explanation for that connection adverts to facts about the objects referred to in the sentences on which the term ‘*qua*’ operates; no additional representational facts are needed. The term plays a pragmatic role in expressing features of the proof-system, but it need not be thought to represent additional model-theoretic structure.

Recall that not every subjunctive conditional that is true in the object-language will be thought of as the expression of a rule of inference. The subjunctive ‘if all mammals were swimmers then  $2+2$  would be equal to four’ is true on my account, but on the supposition that the inference from ‘all mammals swim’ to ‘ $2+2$  is four’ is not part of the circumstances or consequences of application of either of these sentences then it will not be the case that the use of that subjunctive gives expression to a material rule of inference. Similar remarks hold for the individuation of those subjunctives that give the comprehension of kind terms. Intuitively, one understands what it is to be a *K* (what it is to reason with ‘*K*’ terms) when one knows what it is about *being a K* that is warranted by  $\phi$  or that warrants  $\psi$ . For this reason it should not be the case that every object-language subjunctive conditional with a kind term in its consequent or an-

tecedent will give expression to the comprehension of that kind term, the material inferential relations that govern that kind term. And we can express our grasp of those subjunctives that articulate the meaning of a kind term by giving explanations such as ‘sure, if all mammals were swimmers then two plus two would be equal to four, but not *because* all mammals were swimmers’ and ‘if the cup were to be dropped then *for this reason* it would shatter’. These operators furnish a way of picking out, in the object-language, those subjunctive conditionals that are true at a context because of the meaning or comprehension of the term K at that context (in the material mode, in terms of what it is to be a K). As it is our explanatory practices that are primitive on the current account this move is available to us. And given the attention that has been given to explanatory phrases like ‘because’ and ‘for this reason’ in the literature on metaphysical grounding it is worth emphasizing that these putatively metaphysical modalities can be understood in terms of the metalinguistic relations attention to which guides the account presently under development. With this the first criterion of adequacy with which I opened this chapter is satisfied: I have shown how to extend the discussion of chapter 2 so as to account for the material inferential role of kind terms and a corresponding finer grain of object-language detail that the use of kind terms permits us to discriminate.

## 4.2 FROM CIRCUMSTANCES AND CONSEQUENCES OF APPLICATION TO CRITERIA OF IDENTITY AND INDIVIDUATION

### 4.2.1 BACKGROUND

But this definition as it stands is insufficient to demarcate kind terms from nonsortal predicates. While kind terms, like all terms in a language, have circumstances and consequences of application, they also specify a principle of identity and individuation that enables one to sort the individual members of a kind (strictly speaking the sorting is possible only with count nouns or sortals, whereas the identity and individuation of a member of a kind denoted by a mass noun requires a sortalizing phrase like ‘lump of’; I suppress this concern in what follows). Without being able to account for both criteria of application (circumstances and consequences) on the one hand, and criteria of identity and individuation on the other, this account falls down. But this problem is also an opportunity, for if it can be shown that this definition can be supplemented so as to account for the criteria of identity and individuation associated with kind terms, and this on the basis of finding a set of practices that underwrite the identification and individuation of the members of different kinds, then the project as a whole will receive some degree of vindication. The ability to tell a plausible story integrating criteria of identity and individuation with this account of the comprehension (the circumstances and consequences of application) of a kind term can be thought of as a criterion of adequacy for the modal expressivism and descriptive metaphysics in play here.

20<sup>th</sup> century discussion of the ways in which kind terms provide criteria for sorting individuals, counting them and (in the case of ordinary objects) tracking them as individuals over

time, is rooted in Frege's work on the foundations of arithmetic. In the *Grundlagen* Frege argued that the capacity to count something turns on knowing what kind of thing it is you are counting. Without specifying a kind one cannot count anything, and a dummy-sortal like 'thing' will not do the trick unless there are some implicit criteria of identity and individuation fixed by the context: the question 'how many things are there in the car?' does not have a settled answer unless one knows what kind of things are meant. Is the shadow from the steering wheel a thing? Is half the shadow a thing? What about the spatio-temporal trails of the dust motes? Only if there is some determinate conception of what kind of thing one is interested in counting can the process of counting get off the ground. And kind terms permit one to count because they are associated with criteria that enable one to identify and individuate members of the kind.

While Frege's discussion of this issue was circumscribed by his interest in defining the natural numbers, the role of kind terms in specifying principles of identity and individuation has been one of the most fruitful areas of philosophical research in the last hundred years.<sup>52</sup> It is an issue that Dummett, Geach, Quine, Strawson, and Wiggins each made contributions to, often in dialogue with one another, and these discussions have spawned a substantial secondary literature. Investigations into identity and individuation branch into matters concerning metaphysics, the nature of language, and what it is to be a rational actor. Wiggins puts the point as follows:

The practical grasp of identity itself presupposes the capacity to subsume things under kinds, to refer to them and to trace them (or keep track of them). But in order to trace things, one has to trace them in the way that is appropriate to this or that *kind*...(2001 p.18, emphasis in the original.)

---

<sup>52</sup> Given my interest in metaphysics I will be pursuing a metaphysical rather than epistemic reading of these criteria—cf. Strawson (1959) pp.27-49; Williamson (1990) pp.148-53; and Lowe (2009) pp.18ff.

And Lowe:

...the criterion of identity for a sort  $\phi$  determines the conditions under which individuals of that sort will continue or cease to exist—their *persistence* conditions... (2009, pp.67-8.)

The anchor text for this view surrounds some remarks Frege makes in the *Grundlagen* prior to introducing his definition for the natural numbers:

If we are to use the symbol  $a$  to signify an object, we must have a criterion for deciding in all cases whether  $b$  is the same as  $a$ , even if it is not always in our power to apply this criterion. (1950, p.73.)

Compare with Geach:

I maintain that it makes no sense to judge whether things are ‘the same’, or a thing remains ‘the same’, unless we add or understand some general term—“the same F.” (1980 pp.63-4.)

While there is much that remains contested in these debates, it is near common ground that even if criteria of identity and individuation cannot be given explicit formulation, our facility with common nouns in identifying individuals presupposes an implicit grasp of such criteria; cf. Frege’s remark above that in order to count we must have a criterion of sameness “even if it is not always in our power to apply” it, Wiggins’ talk of our “irreducibly practical understanding of ‘the same f’”<sup>53</sup> (2001, p.104; cf. p.7), Williamson (1990):

---

<sup>53</sup> Geach capitalizes his common noun variables; Wiggins does not.

What recognition [of something as something] may require is that an *approximate* criterion of identity should be implicit in the subject's practice, even if the subject cannot make it explicit. (pp.152-3)<sup>54</sup>

and Lowe (1989):

Nor should we expect ordinary unreflective language-users to be able to articulate explicitly the criteria governing their use of a sortal like 'ship': their implicit application of criteria may be discerned in their ability to respond in principled ways to appropriate questions concerning the identity or persistence of ships subjected to various sorts of changes. (p.20)

#### 4.2.2 CRITERIA FOR IDENTIFYING AND INDIVIDUATING A CRITERION OF IDENTITY AND INDIVIDUATION

Frege's approach toward individuating two different objects under a common kind turned on the capacity to count members of the kind. And to count members of a kind, Frege thought, we must know the truth-values of all of a special class of judgments we make with a kind term. Frege called these "recognition judgments." These are judgments that specify when an individual K is the same K as some (epistemically) possibly distinct K (1950, §62). Frege proceeds by endorsing Leibniz's law: a is the same as b just in case 'a' can be substituted for 'b' *salva veritate*. Recognition judgments, then, are those that satisfy a substitution inference from a being  $\phi$  to b

---

<sup>54</sup> Geach (1980) p.181 makes a similar claim about our ability to identify voices without being able to formulate explicit criteria. One way to spell out this difference is by appeal to the early modern distinction between a clear and confused and a clear and distinct concept of an object—both modes of understanding permit one to reliably sort individuals into those that do and those that do not fall under the concept, but only the latter mode permits one to explicitly enumerate the marks that underwrite that sorting in particular cases.



being  $\phi$ . This class of judgments can then be thought of as a set of open sentences ' $\phi x$ ' such that ' $a$ ' satisfies ' $\phi x$ ' iff ' $b$ ' satisfies ' $\phi x$ '. Equivalently, this class of judgments can be thought of as a set of sentences that licenses the intersubstitution of ' $a$ ' and ' $b$ '. "[I]n universal substitutability all the laws of identity are contained" (§65).

There must be some restriction on the truth-preserving class of substitution inferences that give the recognition judgments associated with a kind term, of course, for some open sentences will not permit substitution *salva veritate* even though the singular terms in question refer to the same individual. If the rock that was on your table yesterday is the same as this one on the shelf today, then whatever composition the one has will be shared by the other, but the failure of substitution of these terms *salve veritate* in "I believe that rock is composed of granite" is not a counterexample to the identity claim.

What we need is a way of individuating these substitution inferences. But once individuated that set can be specified in the account on offer. That set will be of the form:

$$\{(\phi a \ \& \ a = b) \vdash \phi b: \text{some condition is satisfied}\}$$

The problem now is to give a specification for the condition to the right of the colon.

The extensionalist can proceed by recourse to the model theory and the properties of the objects in the domain that satisfy sentences of the language on that model—those inferences that give the individuation of the kind are those that permit such substitution *salva veritate* in all extensional contexts. This in fact is Frege's approach. He uses co-extensionality to define the kind 'direction of a line' from the kind 'parallel lines' (§68). Frege is able to do so because he takes for granted a domain of objects (lines) that are already identified and individuated according to

the ‘parallel’ relation and then uses this domain to introduce a new kind, ‘direction of a line’: “We are therefore proposing not to define identity specially for this case, but to use the concept of identity, taken as already known, as a means for arriving at that which is to be regarded as being identical” (i.e., to arrive at a criterion for determining when two lines have the same direction, §63). But on the current order of explanation we cannot take a domain of objects and their properties for granted, for it is precisely the identification and individuation of a domain of objects that we are trying to explain. My task is not to specify a particular kind’s criteria of identity and individuation. Instead I am looking for criteria of identity and individuation for criteria of identity and individuation themselves. To see what this would mean, and what it would take to pull this off, I want to consider Frege’s discussion in these sections of the *Grundlagen*.

#### 4.2.3 EXTENSIONAL AND INTENSIONAL CRITERIA OF IDENTITY AND INDIVIDUATION

It is not uncommon for readers of the *Grundlagen* to puzzle over an apparent tension between the extensional definition Frege gives in introducing a new concept on the basis of old concepts and his context principle: that a word has meaning only in the context of a proposition. This principle is listed in the introduction as one of three “fundamental principles” of the book (p.x), is again so described at the end of the book (§106), and is invoked in §§60 and 62 immediately before the definition of same number (*gleichzahlig*). As ‘*gleichzahlig*’ is a word Frege invented for the *equinumerous* relation, he invokes the principle again by warning his readers that its “meaning is to be gathered, not from its etymology, but from what is here laid down” (§68). And yet in that very section Frege defines the direction of a line *a* as the extension of the concept ‘is parallel to *a*’. He then defines the number of a concept *F* as the extension of the concept ‘is equinumer-

ous with F'. Whereas Frege presents himself as defining concepts in terms of their propositional contexts, and whereas he does appeal to context in the metalanguage with which to explain the meaning of '*gleichzählig*', in the object-language of arithmetic he introduces new concepts on the basis of the extension of old concepts.

Mark Wilson (2007) makes a convincing case that Frege's use of the context principle comes by way of then-contemporary work in defining the 'ghosts' of analytical geometry—imaginary objects like the points at infinity that parallel lines converge at. It happens, for instance, that Frege's use of parallel lines to define 'direction of a line' is a repackaging of the use of parallel lines to define a single point at infinity. In a then-current textbook Theodore Reye writes "I would remind you at this point that the statements "parallel lines have the same direction" and "parallel lines contain the same infinitely distant point" mean exactly the same thing" (quoted in Wilson 2007, p.7). Wilson goes on to show that in the context of analytic geometry the context principle can be read as a way of deflating ontological commitment on the basis of logical regimentation. Commitment to the existence of a deflated notion of object can be understood in terms of a singular term that can 'saturate' different predicates, and there are as many kinds of commitment to different objects as there are ways of decomposing a sentence into saturating singular terms and saturated predicates. Just as a sentence like 'the king lives in the palace' can be decomposed into two different subject/predicate relations, either with 'the king' as subject and 'lives in the palace' as predicate, or 'the palace' as subject and 'thing the king lives in' as predicate, so can solutions in projective geometry be decomposed so as to result in imaginary points as subjects of predication. In this way, Wilson argues, advocates of this program could introduce imaginary points as subjects of predication while avoiding the ontological prob-

lems that the introduction of such points as objects would seem to bring with it (Wilson 2007, p.16; bracketed terms inserted):

Such ontological foibles needn't prove an embarrassment insofar as Stolz and Klein are concerned, for they are not motivated by any philosophical concern to establish imaginary points as "self-subsisting objects". For their purposes, it is enough to settle all discourse of [imaginary points] upon firm truth-values.

By contrast Wilson argues that Frege thinks that contextual definition is sufficient to individuate an object that is ontologically on a par with any other object.

On Wilson's retelling it is the problem raised in §66 that forces Frege to appeal to extensions as *definientia*. In that section Frege points out that to be in possession of the substitution inferences that suffice to define sameness of direction on the basis of being parallel, and thereby to be able to tell for any two directions whether they are identical by determining whether their lines are parallel, one has not yet settled whether a direction of a line is identical with some object that is *not a line*. From §66 (bracketed terms inserted):

[The definition] will not, for instance, decide for us whether England is the same as the direction of the Earth's axis—if I may be forgiven an example which looks nonsensical. Naturally no one is going to confuse England with the direction of the Earth's axis; but that is no thanks to our definition of direction. That says nothing as to whether the proposition

"the direction of *a* is identical with *q*"

should be affirmed or denied, except for the one case where *q* is given in the form of "the direction of *b*". What we lack is the concept of direction; for if we had that, then

we could lay it down that, if  $q$  is not a direction, our original definition will decide whether it is to be denied or affirmed.

Frege goes on to point out that the temptation to use ‘direction’ to define whether something is a direction presupposes grasp of that which was to be explained by definition. These troubles lead Frege, in §68, to “try another way”, and this results in the extensional definition of direction—the direction of line  $a$  is the extension of the concept ‘parallel to line  $a$ ’.<sup>55</sup>

Stepping back, we can reconstruct these moves as follows. The effort to specify the substitution inferences that settle the recognition judgments needed to count individuals by giving an explicit definition of sameness under a kind faces the problem of determining which things are to be considered members of that kind to begin with. As this is just the sort of thing the definition was supposed to settle, it cannot be determined independently of having such a definition. The threat of circularity here pushes Frege to an extensional definition. The tension between thought and deed in Frege’s method—between the context principle as a criterion for introducing new definitions on the basis of their role in judgment and Frege’s use of extensions as a definitional base—is a result of the need to settle, in the metalanguage, just what is to count as a member of the newly introduced class to begin with. Because a definition can settle that issue only on pain of circularity, Frege opts for an extensional interpretation.

But there is another way of thinking about the metalinguistic resources that suffice for introducing criteria of identity and individuation for kind terms. To see our way into this alternative, notice that the definition for a new concept on the basis of the extension of an old concept only succeeds insofar as the extension of the old is fixed. And that means one must already be in

---

<sup>55</sup> Notice that with this formulation Frege is defining the *object* referred to by ‘the direction of line  $a$ ’; had he been defining the concept his definition would read “the concept ‘direction of line  $a$ ’ is the extension of the concept ‘parallel to line  $a$ ’”.

possession of criteria of identity and individuation for the objects in the extension of the old concept. For this reason it is impossible to suppose that all definitions can be introduced in this way (cf. Lowe's discussion in sections 5-7 of his 1997). This is not a problem for Frege, as he was interested in giving criteria of identity and individuation for numbers and so he could take for granted the identity and individuation of other objects: "We are therefore proposing not to define identity specially for this case, but to use the concept of identity, taken as already known, as a means for arriving at that which is to be regarded as being identical" (§63). But as our task is to give criteria of identity and individuation for criteria of identity and individuation, it would seem that an extensional approach would commit us to some set of objects whose identity and individuation conditions are primitive.

Consider the trade-offs here. In giving an object-language definition for a new kind of individual the extensionalist makes use of a model theory on which other kinds of individuals are already identified and individuated. In doing so, if the definition is a good one, she can then settle the truth values of all the substitution inferences that are underwritten by classification under that new kind. But if our task is to determine which class of substitution inferences suffice to identify and individuate objects independent of the identification and individuation of *any* objects, then we cannot help ourselves to a model theory of extensions so as to explain sameness under a kind. More generally, there are two ways of 'decomposing' the problem and its solution, analogous to the two ways one can decompose a sentence like 'the king lives in the palace' into subjects and predicates. On the one hand we can appeal to a domain of objects identified and individuated so as to explain which substitution inferences are underwritten by different kind terms; on the other hand we can appeal to the substitution inferences underwritten by different kind terms and explain the criteria of identification and individuation for a domain of objects on

that basis. On the first approach we use a metalinguistic model of objects so as to interpret an object-language extensionally via this domain. On the second we use a metalanguage of inferential relations and interpret expressions in the object language via their roles in inference. And so on the second method the question of how to understand criteria of identity and individuation is a question of what sort of capacities one must exhibit to count as grasping a kind term's criteria of identity and individuation. Rather than using a metalanguage of objects to determine the object-language inferential role of a kind term, we use a metalanguage of reasoning and explanation so as to determine object-language judgments of identity and difference.

#### 4.2.4 EXPLANATION AS THE EXPRESSION OF CRITERIA OF IDENTITY AND INDIVIDUATION

Criteria of identity and individuation must settle questions of the form 'is a the same individual K as b?', and to do that these criteria must settle which substitution inferences hold. To see how to proceed, consider a related question. In addition to identifying individuals, kind terms enable us to classify different individuals as members of a common kind. And here as well a range of substitution inferences will be warranted. Two rocks that are of the same mineral will share the same composition, though they can differ in size. Two people that hold the same office in some jurisdiction will have the same term of office though they can vary in gender, actual length of the term completed, etc. The classification of an individual under 'same office' in this context warrants the inference from the one being entitled to a term of 6 years to the other being so entitled, whereas the inference from the one completing the term to the other completing it is not warranted. Now consider what one would say if asked why the former inference is good and the latter not—that is, consider how one might go about explaining why these inferences are good and bad

respectively. In response one explains that those who are of that office will, by the laws of the jurisdiction, be entitled to hold a term of 6 years, but that there is no similar relationship between the laws and the completion of one's term in office. The two individuals are of the same office, and *for this reason* the one's length of term is the same as the other's. Here the kind term enters into a certain form of explanation justifying the inference in question. Similarly, if asked why one can infer from two rocks being of the same mineral and the composition of one being granite that the other is granite it is natural to respond by explaining that what it means to be a mineral is to be composed of a certain stuff. By contrast, we could go on to say, being of a certain size is not part of what we take a mineral to be as the kind of thing it is. And it is because two animals are of the same subphylum that the one would be a vertebrate just in case the other were, while from the one having fins it does not follow that the other would. Two animals of the same species, however, license both of those inferences, and this because, we explain, gross bone structure is part of what is determined by one's species.

This shows that our practices of explanation themselves specify which substitution inferences constitute the class that is associated with a given kind. The elements of that class are those inferences that are good, we explain, because of what it is to be a member of the kind (the meaning of the kind term) in question. And this means that we can appeal to these practices of explanation in giving a condition that specifies the class of substitution inferences that expresses our grasp of sameness under a kind. Just so, we can appeal to our *grasp* of identity to individuate that class of substitution inferences that *expresses* our grasp of identity:

$$\{(\phi a \ \& \ a = b) \vdash_m \phi b: \text{ If } a \text{ were } \phi \text{ then } b \text{ would be } \phi \text{ because } a \text{ and } b \text{ are the same individual } K\}$$



One might have reservations about the use of a ‘because’ operator for specifying the subjunctives that give the criteria of identity and individuation for a kind term. For it can seem that an appeal to explanations of sameness of kind, and of being the same individual member of a kind, presumes that which one wants an explanation of. But consideration of the material inferential expressivist order of exposition adopted here, as contrasted with the extensional representationalist approach, shows this reservation to be unfounded. While the representationalist presupposes a domain of individual objects and the properties they bear so as to explain the truth makers for sentences about those objects, thus requiring her to add more structure to her model in order to interpret new claims understood representationally, the expressivist foregrounds the role of object-language expressions as means of *specifying* the rules of inference that govern the language. With a set of objects, properties, and facts taken as her semantic primitive the extensional representationalist proceeds to individuate the class of substitution inferences two terms must satisfy if the referents of those terms are identical: grasp of the criteria of identity and individuation associated with a kind term is exhibited in one’s grasp of the truth conditions for these substitution inferences, where these truth conditions are given by the model theory the extensionalist has taken for granted. On my order of explanation, by contrast, I presuppose a set of explanatory practices and the material inferential relations occurring within them so as to specify those substitution inferences the grasp of which constitutes one’s grasp of the criteria of identity and individuation associated with different kind terms. And just as ‘*qua*’ expressions in the object-language can be understood to perform a purely pragmatic role, operating as devices for expressing to an auditor that the language has a certain structure, so can occurrences of ‘because’ be interpreted as a covertly metalinguistic device for *specifying* those subjunctive conditionals

that articulate criteria of identity and individuation for different kinds. The thought is that these uses of ‘because’ in the object-language specify those subjunctive conditionals/rules of inference that are good in virtue of (are underwritten by) what it means to be a K; but the object-language use of these locutions does not commit us to any additional representational content. Just as ‘*qua*’ inherits whatever representational dimensions are employed for spelling out why a given rule of inference is part of the circumstances or consequences of application of a particular kind term without adding any additional (non-minimalist) representational content to a sentence in which it occurs, so does an occurrence of ‘because’ in an object-language sentence specifying the criteria of identity and individuation associated with a kind term require no additional representational content beyond that which is spelled out by the ordinary representational claims made in justifying the use of that particular criterion of identity and individuation. On this account the employment of so-called grounding explanations in the object-language sentences that articulate a kind term’s circumstances and consequences of application, and the criteria of identity and individuation for the associated kind, play a purely pragmatic role.

Whereas the extensional representationalist presupposes a metalanguage of extensions and truth conditions for interpreting the object-language, I presuppose a proof theory of comprehensions and inferences and argue that we should understand the role of some terms not in virtue of a prior grip on the objects and properties of a model, but rather as means of giving expression to metalinguistic inferential relations. My order of explanation and the representationalist’s are of a piece, each adopting a metalanguage whose resources make possible a particular interpretation of object language sentences. Each approach is analogous to the two different ways one can decompose a sentence with two saturated positions into a singular term and a predicate. But whereas the extensional representationalist uses a metalanguage of objects and properties to pre-

scribe a reading of different sorts of object-language vocabulary, mine is a descriptive project directed at laying out and coming to some understanding of our practices of explanation and judgment as they already obtain by arguing that different classes of object-language terms can be understood as means of expressing commitment to the rules that govern the rest of the language.

This means that the account of the subjunctive conditional developed in the last chapter, augmented by the resources appealed to in talk of practices of explanation, is fit to specify *both* the circumstances and consequences of application of a kind term *and* the criteria of identity and individuation that determine when some K is the same individual as some other K. Indeed, the subjunctive interpretation of the comprehension of kind terms quite naturally accounts for the criteria of identity and individuation that are associated with different kind terms. Knowledge concerning how an individual would and would not behave in various situations, knowledge the grasp of which is a condition on picking out and understanding individuals at all, is knowledge that is mediated by our classifying individuals into kinds, where different kind terms specify different constellations of material inferential reasoning; in the material or object-language mode, the members of different kinds occupy different regions of subjunctive space, so that grasp of the subjunctive profile of an individual via a kind term *just is* grasp of it as some sort of determinate individual.

#### 4.2.5 FROM A MATERIAL INFERENTIAL MODAL EXPRESSIVISM TO A DESCRIPTIVE METAPHYSICS OF KINDS

In section **4.1.1** I summarized a line of thought one finds in Peirce, Sellars, and Brandom concerning the role that subjunctive reasoning plays in facilitating our grasp of individuals, and in

section **4.1.3** I argued that the material inferential interpretation of the subjunctive conditional developed in chapter 2 provides a way of thinking about a kind term's circumstances and consequences of application along lines suggested by the Peirce/Sellars/Brandom point. This is also a way of working out the proof-first method of explanation discussed in section **4.1.2**, for the notion of comprehension given above uses these resources to give an interpretation of the semantic role of kind terms as material inference tickets. On this view the role of a kind term is to classify an individual according to a complex set of material inferential relations that the use of that term implicates at various contexts. Grasp of these inferential relations (including language-entry and language-exit relations) constitutes one's grasp of the concept that kind term connotes, so that grasp of worldly individuals is mediated by one's grasp of the kind terms one uses to reason about individuals.

In going in for this account of kind terms the view has the advantage of avoiding the metaphysical speculation that comes with interpreting kind terms denotationally, raising questions about, e.g., what object, abstract object, or set of objects would make a sentence like "the African lion is in danger of extinction" true. The material inferential interpretation of a kind term is an interpretation that is founded on the role of kind terms in reasoning and explanation rather than on their representational roles as denoting universals, sets of individuals, etc. Anyone who is able to use descriptive vocabulary to talk about individual objects is already engaged in a set of practices that the use of kind terms makes explicit, for kind terms permit us to identify and individuate objects in the first place. Because explanation and description proceed hand in hand, and because a grasp of the inferential role of kind terms is what facilitates explanation, the inferential role of kind terms underwrites the use of those terms as descriptions of the world. The Peirce/Sellars/Brandom point about the role of the subjunctive conditional in our explanatory

grasp of individuals and the Frege/Geach/Wiggins/Lowe point about the role of kind terms in specifying criteria of identity and individuation should be seen as two aspects of a single idea. Our understanding of worldly particulars is mediated by our grasp of the role of kind terms occurring in those subjunctive conditionals that specify the rules of inference that govern our understanding of individuals. We can now say that a grasp of *what it is to be* something, where this means grasp of the subjunctive relations that carve out the space of possibility surrounding different kinds of object, is mediated by a grasp of *what it is to reason* with different kind terms. Because the subjunctive conditional is given a material inferential interpretation this notion of comprehension has a right to be seen as codifying pre-existing practices. From the other direction, because these material inferential relations have their object-language expression in subjunctive conditionals this codification of inferential practice is at the same time an articulation of the metaphysical commitments we take up in virtue of how we reason about the world. The second part of the dissertation uses this framework to descriptively articulate the metaphysical commitments implicit in the use of ontic, teleological, and normative modality in reasoning about different kinds of kind.

## 5.0 ON THE REPRESENTATIONAL DIMENSIONS OF MODAL EXPRESSIVISM

*[B]y nature and according to logical order every calculus comes after the understanding of the matter to which the calculus is applied....He who invents does not begin from a calculus, but from the consideration of things.*

Gottfried Ploucquet, *Methodus calculandi in Logicis*:

This chapter marks a transition between the modal expressivism that it has been the aim of the first half of this dissertation to provide, and an investigation into the descriptive metaphysics that this expressivism affords. At the opening of the Introduction I claimed I would be arguing that the italicized phrases in the following paragraph play no (non-minimalist) role in representing the world that goes beyond the representations that are caught up in the sentences composing the rest of the paragraph:

We are each of us identical with the human organism we are, and *in virtue of* this identity our lives as persons are bound up with the purposive and normative valences we carry as organisms. But as persons we are capable of rational self-government, and *for this reason* we are different in kind from the merely organic. Nevertheless, considered *qua* the collections of electro-chemical and mechanical processes that

constitute organic bodies there are no natural purposes. This is *because* the relation of constitution is not that of identity, *so that* the modal profiles of our organic and personal existences do not pertain to the collections of chemical stuffs that constitute us at any given time. *In virtue of* these facts an ungrudging recognition of the existence of natural purposes, and the artificial purposes made possible by persons, is compatible with an order of understanding along which there are no purposive events in the world.

With the material inferential modal expressivism developed in the first half of the dissertation that argument is complete. On the picture developed in the last three chapters, the italicized terms in this paragraph all play a *purely pragmatic* role (cf. 2.2.5-6 and 4.1.2-4)—they give expression to explanatory connections between different facts without themselves adding some new fact to those they express connections among. To understand some explanatory relation, e.g. between the striking of a match and its lighting, one must look to material facts concerning matches as the kinds of thing they are; there is no point in positing special relations of grounding that account for the role of those explanations, as their role is pragmatic. When these grounding explanations are understood as devices meant to express commitment to the proof-theoretic structure of the language, the material rules of inference governing the sentences of the language, then there is nothing to be said about general model-theoretic conditions that give truth values for sentences with these explanatory terms as their major operators. Instead, to explain why a claim like ‘if the match were struck then, *qua* coated in phosphorus, it would light’ one adverts to material facts about phosphorous as the kind of stuff it is. To put the point metaphorically we can say that these operators are *transparent* to the representational contents of the sentences that

saturate them in particular uses, and it is the material content of those sentences that explain in a given case why a particular explanation is good.

I also claimed in the Introduction that I would be defending the above paragraph as a set of truths about the world. The second part of the dissertation is directed at that desideratum. The line of thought developed in the first half suggests that the superficial similarity between the three answers to the following questions masks an underlying difference in what they represent about the world:

Why is she walking around the field rather than through it?

- Because it's muddy.

Why did is there now more carbon dioxide in the gas chamber and less oxygen?

- Because the oxygen that fueled the fire bonded with the carbon in the wood.

Why is the plant growing in that direction?

- Because that's where the sunlight is.

Given a purely pragmatic reading of these grounding explanations, as with those in the paragraph above, a defense of such claims must proceed by recourse to a consideration of material facts concerning personal agency, chemical activity, and organic growth. As I am interested in dividing the field here, there are two primary divisions in this triumvirate: one between chemicals and organisms/persons, and the other between organisms and persons. The first division is marked by the use of teleological and normative modality for organisms and persons but not chemicals.



By the end of this chapter I will argue that our representational commitments concerning organisms as *constituted by* but not *identical with* the chemical (mechanical, electrical, etc.) parts that compose them enables us to mark the first division. The second division concerns what specifically differentiates the teleological and normative modal profiles of persons as against organisms; this division will be marked in the discussion of persons in chapter 7, after chapter 6 lays out teleological and normative profile of organic activity.

In this chapter I set the stage for the metaphysical project that takes place in the second half of the dissertation by considering just what sort of representational commitments the expressivist can (or should) take up. I proceed by comparing the view developed in previous chapters with the modal expressivisms of Robert Brandom, Huw Price, and Amie Thomasson. In part 1 I raise three problems that modal expressivists need to address: first, concerning the sense in which ontic modal claims about the world represent the world; second, concerning how to avoid a conventionalist understanding of modality; and third, concerning how to extend expressivism from the ontic to the normative and teleological modalities. In part 2 I address the first of these two problems, arguing that we can make out six grades of representational commitment in the use of modal vocabulary, the fifth of which suffices to distinguish a sense in which nomological modal claims represent the world. Crucially, it will be possible to address the problem of conventionalism without having to go in for the fifth grade of modal representational commitment, so that we can make sense of the objectivity of math and logic without having to suppose the ontological commitments of these domains are on a par with those of the natural and social sciences. The third problem, expanding the expressivism developed for the ontic modalities in the first half of the dissertation to the normative and teleological modalities, will be addressed in chapters 6 and 7. As preparation for that development, the sixth grade of modal representational com-

mitment will build upon the fifth by considering how talk of constitution relations between wholes and their parts relies upon differentiating the modal profiles of wholes and parts. At the end of the chapter I will argue that talk of constitution relations between parts and wholes makes possible a teleological understanding of organic generation and growth that is consistent with a non-teleological understanding of the chemical processes that constitute organic individuals.

## 5.1 MODAL EXPRESSIVISM: ITS PROMISE AND PROBLEMS

### 5.1.1 THE PROMISE OF EXPRESSIVISM AS AN ALTERNATIVE TO REPRESENTATIONAL THEORIES OF MODALITY

One advantage of expressivist approaches toward modality is that questions concerning what is represented by modal vocabulary are avoided, for representation does not play a significant role in the expressivist's interpretation of modal claims. In his "Autobiographical Reflections" Sellars remarks that early on in his intellectual development (while at Oxford under a Rhodes scholarship) he had become convinced of a need to give a non-representational account of modality (1975 p.285):

The situation was roughly the following. I had already broken with traditional empiricism by my realistic approach to the logical, causal, and deontological modalities. What was needed was a functional theory of concepts which would make their role in

reasoning, rather than a supposed origin in experience, their primary feature. The influence of Kant was to play a decisive role.

Developing this Sellarsian theme, Brandom has urged us to understand modal vocabulary as a means of expressing commitment to general inferential relations among ordinary descriptive vocabulary rather than as a source of a special sort of description (chapters 4 and 5 of 2008). In a variety of publications Huw Price (1997, 2003, 2008, 2011a, 2013, unpublished) has argued that the lack of representational commitment is one of the modal expressivist's defining features, and he counsels minimizing representational relations between language and the world across the board (this claim will be modified slightly with the discussion of Price's bifurcation thesis in section 5.2.2). Though Brandom downplays the representational side of modal vocabulary, in places this radical anti-representationalism has put Price at odds with Brandom (Price 2008 and chapter 14 of 2011b, though chapters 2 and 3 of Price 2013 emphasize their commonalities; Brandom discusses their respective positions on representation in chapter 7 of his 2011). Thomasson's approach likewise has the merit of avoiding otiose ontological commitment and questions of epistemic access. For if object-language modal talk is a disguised use of metalinguistic imperatival discourse, then the question of how we come to *know* a modal fact is resolved into a question of how we come to *follow* a command concerning the use of language, and the latter question does not require that we posit special relations of representation.

### 5.1.2 MODAL EXPRESSIVISM: THREE PROBLEMS

But expressivist approaches toward modality have difficulties of their own. I will discuss three. In the first place, it is not clear what we should think about the representational dimension of language once we have shifted to an expressivist interpretation. To express commitment to a rule or command is not to represent the world, but this by itself does not tell us whether a claim like ‘necessarily, salt dissolves in water’ contains some representational residue. And crucially, no one in these debates is committed to the claim that to interpret a modalized assertion as an expression of some sort, e.g., a rule of inference, is to suppose that in *using* a modal in making an assertion one is *saying* that, e.g., a rule of inference holds. Sellars resists this identification in §§78 and 81 of (1958), Price in §5.1 of chapter two of (2013), and Brandom in chapter 5 of (2014). Intuitively, to assert a modal claim like ‘salt necessarily dissolves in water’ is to say something about, and so represent, the world. But there is no unanimity among these figures about what such a claim represents, or why it represents as it does.

A second problem facing modal expressivists centers on questions concerning what justifies the use of modal vocabulary. Focusing on nomological modality, modal expressivists need to avoid sliding into a conventionalism about the rules that underwrite modal talk. If the use of a modal claim is to be understood in terms of the expression of a rule or command, then one might worry that, on this account, the presence of a social convention is that which makes the use felicitous. But we want the felicitousness of a nomological modal claim to be, in some way, explained by the fact that the world is the way it is. And that means we do not want to tie the truth of modal claims to the existence of a rule in a community—for the rules themselves must be constrained by the world, and if the truth of ‘necessarily  $\phi$ ’ were to come down to the existence

of a rule then conventionalism is upon us. To avoid this we must be able to recognize cases where even though there *is* a rule in a community licensing, for instance, the assertion that the phlogiston has left the wood when it burns, there ought not be such a rule. The most straightforward way to handle such a case is to say that it is because *the world* is some such way that the rule ought to be changed. Such an explanation is not on offer, however, if an expressivist equates the truth (or warranted assertibility) of a modal claim with there being a rule in a community for its use. If we are to interpret object-language ontic modality as a transposed metalinguistic use of deontic or imperatival discourse, it may nevertheless be that talk of the states of affairs that are *represented* by these expressions cannot be eliminated entirely from our account of the role such expressions perform. This is to raise again the question of whether and if so in what sense modal claims represent the world, and so an expressivist address to that question should have something to say about whether (and how) conventionalism can be avoided.

Finally, expressivist theories of modality do not offer the sort of breadth of coverage that representational theories offer. While Sellars and Brandom each in their own way have worked out an interconnected story about the role of subjunctive conditionals and disposition terms in mediating our grasp of individuals, and of the role that the ontic and deontic modalities play in this process, theirs is a story focused on object-language causal modalities and a metalinguistic deontic modality. But object-language occurrences of metaphysical and teleological modalities are not considered by either of them, and object-language uses of the normative modalities only occasionally (e.g. in the last chapter of Sellars 1967). And while Thomasson has given a picture on which metaphysical modality is to be understood in terms of metalinguistic imperatives, she too has not yet considered the role of nonontic object-language modalities. Now it might be thought that subjects as heterogeneous as metaphysical modality, normative modality, teleologi-

cal modality, and the subjunctive conditional cannot be understood by one and the same explanatory method. But given that we also issue teleological and non-deontic normative sentences in characterizing the world—paradigmatically in talking about how organisms and artifacts are and ought to be constituted—it does not seem unreasonable to want an account of how at least these object-language modals are to be understood on an expressivist line. As the rules (or commands) appropriate for the use of normative and teleological vocabularies differ from the rules (commands) appropriate for the use of ontic modality, it is not a foregone conclusion how this account is to be given.

Part 2 of this chapter addresses the first two of these problems—the debate between Brandom and Price on the relationship between expressivism and representationalism, and the question of whether conventionalism about the metaphysics and the laws of nature is a consequence of expressivist theories of the metaphysical and causal modalities. At the end of the chapter I will offer some prefacing remarks about the third problem, a task which it is the burden of the next two chapters to address.

### 5.1.3 REALISM AND REPRESENTATION IN MODAL DISCOURSE

It is not clear what we should think about the representational dimension of language once we have shifted to an expressivist frame. Two related issues need distinguished here. On the one hand there is the question of whether modal claims ought to be seen as fact-stating. Call this the question of *modal realism*. On the other hand there is the question of whether modal claims represent the world. Call this the question of *modal representationalism*. The first question con-

cerns whether and in what sense modal claims purport to state facts about the world; the second concerns whether and in what sense modal claims purport to represent the world.

Modal expressivists are within their rights to be realists about modal vocabulary, holding that the assertion of a modal claim is fact-stating, in the *minimalist* sense that any declarative sentence can be supposed to be fact-stating. Minimalism affords a straightforward answer as to what is being said with a modal claim like ‘salt necessarily dissolves in water’. For what is said is simply that salt necessarily dissolves in water. But the minimalist foregoes telling a story about what the truth-makers are for that sentence. Semantic minimalism about the truth predicate offers a constructive comparison. Whereas a truth-maker theory will explain the truth of the claim that snow is white in terms of, e.g., relations between subsentential expressions and their referents, a semantic minimalist holds that the truth predicate should be understood disquotationally. To say

‘Snow is white’ is true

is to say that snow is white. On this view there is no special property of truth that needs explanation, and so no need to wheel in truth makers to explain that property. Nevertheless, we can continue to use truth-talk; it is now disquotationally domesticated. Minimalist modal realism likewise clears the way for holding that modal sentences state facts in an anodyne way—one that is free from any burden of positing truth-makers to explain what the fact-stating character of modality consists in. Blackburn’s *quasi-realism* is of this minimalist form of modal realism. Brandom is also a modal realist in this minimalist sense.

But a minimalist commitment to modal realism does settle the sense in which modal language is supposed to represent the world. A natural extension of minimalist modal realism is minimalist modal representationalism: just as the sentence ‘salt necessarily dissolves in water’ says nothing more (for the purposes of semantic theorizing) than that salt necessarily dissolves in water, so might one hold that it represents salt as being such that it necessarily dissolves in water, where one suppresses any urge to tell a semantic story about word-world (or word-possible world) relations that make that sentence represent as it does. In being a minimalist about representational language as well as about modal realism, one would allow that the use of such language is apt while withholding the judgment that its aptness is to be explained by a semantic theory invoking word-world relations. Call this the *first grade of modal representational commitment*. On this view, modal language represents the world in the minimalist sense that modal claims have a declarative grammar; the first grade of modal representational commitment inherits the minimalism of minimalist modal realism.

On the other hand, one might be a global minimalist about representational discourse, allowing that it is everywhere and always appropriate to talk of representation for language that is expressed in a declarative grammar, while holding that in addition some declarative sentences represent the world in some richer sense. But this raises questions concerning where the distinction between substantive and nonsubstantive representation talk is to be drawn, and on what basis. Price discusses this problem under the heading of *the bifurcation thesis*, and he points out that one who is committed to such a distinction owes us a story about why the line is drawn where it is (2013, ch. 2).



#### 5.1.4 A PRAGMATIST DEFENSE OF THE BIFURCATION THESIS: THREE CRITERIA OF ADEQUACY

Price defends a minimalist version of modal representationalism, but he leaves open the possibility that a more substantive notion of representational commitment might be had. He develops this idea by distinguishing two sorts of representation: i-representation ('i' for talk of representation that is *internal* to a discourse) and e-representation ('e' for talk of representation that involves *external* or *environmental* relations between language and the world). 'I-representation' refers to the use of representational vocabulary in explicating the rules that govern the use of other vocabulary. Though we make use of representation-talk to explain our propositional commitments, we need not explain that use via a semantic theory that reifies talk of representation with a postulation of special word-world relations that explain what that use consists in. Instead, that use is explained in terms of the discourse-internal process of triangulating propositional commitments. 'E-representation', on the other hand, refers to the use of representational vocabulary in specifying semantic relations of reference and representation whose role it is to explain why the language means what it does.

Price's distinction between i-representation and e-representation opens up the possibility that one could be a modal realist in the minimalist sense while also holding that at least some modal discourse is e-representational. Price himself allows that there might be room for reconstructing a bifurcation thesis on the basis of the distinction between i-representation and e-representation. But he proposes to do so from within a frame that takes i-representation as basic (§6.2 of 2011a). On this view all representation talk is i-representational, in the sense that it codifies the practices surrounding the use of that language. But some i-representational practices

may be such as to institute e-representation relations between language and the world.<sup>56</sup> To reconstruct a bifurcation thesis in this way would be to show how a discourse commits itself to representation relations between words and the world in virtue of something that the users of that discourse *do*. I think we should see this as a view on e-representation that is consonant with Brandom's view that the point of postulating semantic *explanatia* for a language is to codify the practices of a linguistic community.

In the rest of this chapter I will discourse five more grades of modal representational commitment, with the aim of establishing a bifurcation thesis. I set the criteria of adequacy for this task, one methodological and the other two in terms of content. On the side of methodology, I take it that the justification for a bifurcation thesis must be consonant with Brandom's pragmatism and Price's commitment to the primacy of i-representation. That is, I take as a criterion of adequacy that a distinction between a minimalist notion of modal representationalism and a more substantive one proceed by explicating that distinction in the basis of the practices of using representation language within a discourse. As a first criterion of adequacy concerning the content of this bifurcation, I take it that a reconstruction of an e-representational domain of discourse from within an i-representational account of the use of representational vocabulary must be such as to include the natural and social sciences on the side of e-representation, and to exclude logic and mathematics (I will sometimes use 'natural sciences' as inclusive of the social sciences in what follows, as the contrast is with the formal sciences of logic and math). Finally, as a second criterion of adequacy concerning the content of this bifurcation, I will require that the distinction between the modal representational commitments exhibited in the natural as against the formal

---

<sup>56</sup> At §6 of chapter 2 of his (2013) Price appears less sanguine about this prospect, however. I think the two positions can be reconciled, though to do so here would take us too far afield.

sciences be such as to underwrite a consideration of the third problem introduced in part 1 of this chapter—namely, how to extend the modal expressivism developed in the first half of the dissertation to a consideration of nonontic modalities. By having a sense of representation sufficient to satisfy this last criterion of adequacy, we will be prepared to make the transition from the modal expressivism of the first half of the dissertation to the metaphysics of kinds that occupies the second half.

## 5.2 SIX GRADES OF MODAL REPRESENTATIONAL COMMITMENT

### 5.2.1 THE SECOND GRADE OF MODAL REPRESENTATIONAL COMMITMENT: WHAT DISCURSIVE PRACTICE DOES REPRESENTATIONAL VOCABULARY MAKE EXPLICIT?

We have already seen the first grade of representational commitment. According to the minimalist, any sentence with a declarative grammar can be supposed to represent the world. That by itself is not enough to warrant a bifurcation thesis between the natural and formal sciences, however, for assertions in logic and math are likewise declarative—as are assertions in games like chess, which one might think are representational in a sense weaker even than the claims made in logic and math. Cleaving to that pragmatist commitment, there must be something about our practice of *using* representational talk that is sufficient, from within that practice, to demarcate those discourses that are e-representational from those that are merely (i.e., in the minimalist sense) i-representational.

Brandom has argued that anyone who makes a *de re/de dicto* distinction in propositional attitude ascriptions is thereby committing herself to there being some way the world is about which others can be right and wrong (in the last chapter of his 2011). For instance, suppose Alice asserts “the man in the corner drinking champagne is angry” and that Bill believes the man in the corner is not drinking champagne. Bill can report Alice’s assertion, recording what she *said* about the man in the corner from what he himself believes is true *of* him, with the claim “Alice said *of* the man in the corner *that* he is angry.” By using these *de re* (‘of’) and *de dicto* (‘that’) clauses, Bill is able to distinguish *what* Alice has said about the man in the corner from what Bill himself believes is true *about* him. In doing so Bill is expressing a commitment to there being some object which Alice represents as both angry and drinking champagne, and which he himself represents only as angry. In this way explicitly representational commitments show up as a feature of the propositional score-keeping that constitutes an up-and-running linguistic practice.<sup>57</sup> For Brandom, any discourse within which speakers mark *de re* and *de dicto* propositional attitude ascriptions is a discourse within which talk of representation is felicitous, and this because representation-talk allows one to make the discursive significance of these *de re* attributions explicit.

Any discourse within which a distinction between *de re* and *de dicto* attributions are marked is a discourse within which the speakers represent things *about which* we can disagree concerning what we take to be the case. The modal corollary to this commitment to representa-

---

<sup>57</sup> At pp.499-508 of his (1994) Brandom introduces *de re* ascriptions as what makes explicit a practice of endorsing a set of substitution inferences governing singular terms as referring to the same individual. That is, I endorse an identity between the referents of ‘a’ and ‘b’ if I am willing to ascribe commitments that you take up with the use of ‘a’ by substituting ‘b’ in its place, and *de re* locutions make that commitment explicit; when I report your claim that Mark Twain was an author as ‘she said *of* Sam Clemens that he was an author’ my willingness to substitute ‘Sam Clemens’ for ‘Mark Twain’ and use the *de re* locution ‘of’ expresses my commitment to the identity between the referents of those two terms.

tionalism is exhibited in corresponding distinctions between propositional attributions in modal contexts. Suppose a speaker Alice believes that it is necessary that water boils at 100 degrees centigrade, but does not believe that water is  $H_2O$ . A speaker, Bill, who does believe that water is  $H_2O$  can report Alice's belief while using the term ' $H_2O$ ' but while cordoning off attribution of that commitment to her by pulling that term out into a *de re* context: "Alice believes *of  $H_2O$  that* it necessarily boils at 100 degrees centigrade." The pronoun 'it' picks up its reference anaphorically on Bill's use of ' $H_2O$ ', but because that latter term is separated from the *de dicto* context in which Bill attributes a belief to Alice he does not thereby attribute to her the belief that water is  $H_2O$ . Call this *the second grade of modal representational commitment*. That it is not presupposed by the first is evident from the fact that it is conceivable that a discourse could record only *de dicto* attributions concerning what people believe without those who do the reporting thereby committing themselves to the existence of any objects toward which those beliefs are directed (perhaps the atheist's reporting of a conversation about angels is like this).

Nevertheless, the second grade of modal representational commitment is present also in discourse about mathematics, for we can make *de re* propositional attitude ascriptions about abstract objects as well. For instance, one who does not know that the largest prime number under 1000 is 997, and who asserts 'necessarily, the largest prime number under 1000 is odd', can be reported as having said *of 997 that* necessarily, it is odd. And so the *de re/de dicto* distinction is an account of i-representation that does not by itself institute e-representational relations sufficient to distinguish the natural from the formal sciences.<sup>58</sup>

---

<sup>58</sup> In chapter 1 of his (2014) Brandom characterizes descriptive vocabulary as any vocabulary that does not stand as LX (elaborated from and explicative of) any other vocabulary. This has the result that modal vocabulary is not descriptive, though mathematical vocabulary is. This notion of descriptive is orthogonal to the issue of representation that I am interested in here.

## 5.2.2 THE THIRD GRADE OF MODAL REPRESENTATIONAL COMMITMENT: THE I- REPRESENTATIONAL DIMENSIONS OF SUBJUNCTIVE CONDITIONALS

The use of kind terms in explanation affords a different sort of representational capacity. To see this, I want to bring in some of the resources developed earlier. Chapter 2 argued that the assertion of a subjunctive conditional ' $\phi > \psi$ ' at a context could be understood as a means for expressing commitment to the goodness of an inference from  $\phi$  to  $\psi$  at that context. Chapter 4 argued that an important class of subjunctive conditional involved the use of kind terms in either the antecedent or consequent of a subjunctive, and where the subjunctive was justified by appeal to those kind terms. Together these two commitments entail that those subjunctive conditionals that are underwritten by an explanation adverting to the kinds whose terms occur within them give object-language expression to the circumstances and consequences of application of those kind terms; for when the subjunctive conditional is interpreted as the expression of a rule of inference those subjunctives with a kind term in their antecedent give the *consequences of application* of the kind term, while those with a kind term in their consequent give the *circumstances of application* of that kind term. And so to say that some bit of gold would dissolve if it were immersed in *aqua regia* is to give expression to the fact that the inference from 'this gold is immersed in *aqua regia*' to 'this gold dissolves' is a good one. It is thereby possible to understand our commitments concerning what it means to *be* a K in terms of what it means to *reason* with K terms. For on the side of being the subjunctive conditionals that are part of a kind term's comprehension specify those facts that obtain for the kind at that context. And on the side of meaning those conditionals give expression to the rules of inference that govern the use of the kind

term at that context. *Metaphysical* vocabulary in the object-language then shows up as covertly *metalinguistic* vocabulary.

Now consider the role of kind terms in the explanations we give for modal claims. Suppose someone is worried about being electrocuted when grasping the handle of a tool, and that an interlocutor tells her that the handle cannot electrocute her. If asked why this is so, the interlocutor can respond “because it is made of plastic.” In this way a modal claim is justified by recourse to something about the kind that is discussed in that claim.<sup>59</sup> The same point holds for subjunctive conditionals. The claim ‘if the cup were dropped it would break’ is explained by the fact that the cup is made of glass. Because the ontic modalities were interpreted in chapter 3 as quantifications over the antecedents of subjunctive conditionals

$$\Box\varphi =_{\text{def.}} (\forall p)(p > \varphi)$$

$$\Diamond\varphi =_{\text{def.}} (\exists p)(p > \varphi)$$

on the current project these two forms of expression are instances of one general phenomenon, so that an account of the representational dimension of the subjunctive conditional will also be an account of the representational dimension of the strong and weak ontic modal operators. And explanations of the form ‘if t were P it would be Q, because t is a K’ represent the world as a domain of objects whose membership in various kinds explain why different subjunctives are

---

<sup>59</sup> As suggested in 3.1.2 there is some go to using these explanations in order to determine what premises are quantified over with an ontic modality. For even though it is true that if this handle were made of metal it would electrocute you, the truth of ‘necessarily, this handle will not electrocute you’, where this means  $(\forall p)(p > \text{this handle will not electrocute you})$  is explained by the fact that ‘this handle is made of metal’ is not part of the domain of quantification, and *that* is explained by the fact that being plastic is what explains the necessity claim in the first place. This latter fact can be expressed in the object-language with the *qua* device: necessarily, *qua* plastic this handle will not electrocute you.

true. Call this the *third grade of modal representational commitment*. Any discourse that makes use of kind terms in explaining why subjunctive conditionals obtain is a discourse that represents the world as constituted by objects that fall into kinds.

The second grade of representational commitment is a restriction of the first rather than a presupposition of it—though all modal claims are i-representational in that they have a declarative grammar, only some are caught up in practices within which speakers discriminate *de re* from *de dicto* attributions. The third grade of modal representational commitment is presupposed by the second, however. For discriminating objects about which *de re* speakers track various propositional commitments presupposes criteria of identity and individuation for those objects. Because kind terms specify those criteria (cf. part 2 of chapter 4), it follows that any discourse within which speakers use *de re* propositional commitments is a discourse that classifies objects according to kinds. Those kinds may include social and moral kinds as well as natural ones, and this will be reflected in the use of kind terms to justify non-ontic modal assertions. For we explain that it is because he is a police officer that he ought to give chase, or because alcoholism is a vice that it ought to be discouraged. Insofar as we make use of these sorts of kind term involving explanations of the corresponding modalities, we are committed to seeing the world as divided into objects that fall under kinds that stand in various factual relations.

We are not yet in a position to demarcate the natural from the formal sciences, however. For ‘objects’, ‘kinds’, and ‘facts’ here should still be understood in an i-representational framework that does not suffice to distinguish e-representational discourse, and a claim like ‘if the answer were 17 it would not have any divisor other than 1 and itself, because 17 is a prime number’ will satisfy the third grade of modal representational commitment as well. Still, we are making progress in that kind terms, as they figure in the explanations for the assertion of subjunctive sen-



tences, are a point of orientation concerning how those subjunctives i-represent the world. The question of how modal language i-represents the world thus becomes a question of how our kind term-involving explanations of modal claims come to i-represent the kinds those terms refer to.

### 5.2.3 THE FOURTH GRADE OF MODAL REPRESENTATIONAL COMMITMENT: I-REPRESENTATION AS A FUNCTION OF LINGUISTIC REVISION

Again Brandom offers a way forward. For as he points out, based on a reading of Kant and Hegel, it can happen that we can both be committed to a sentence on account of an inference underwritten by the material content of some set of sentences we are entitled to, and committed to another sentence which is incompatible with the first. When we are put into this position in virtue of the content of the terms of the language, this puts us into a position in which we must revise the inferential commitments we take to be wrapped up in those terms. And the practice of revising a language on this basis is a practice of coming to improve the representations the language makes available.

Consider the case of light at the turn of the last century. It was thought that the speed of light would vary depending upon the relative motion of a frame of observation and a light source—when a light source was moving toward a frame of observation, light waves would be measured as travelling faster than when a light source was moving away from a frame of observation. This being so, various subjunctive conditionals were implicated at a context in virtue of the inferences that were wrapped up in the term ‘light’: e.g., if this light source were to be placed on a train moving rapidly away from us, then its speed would be slower relative to a light source that was not moving rapidly away from us. At a context in which a light source moving

rapidly away from an observer was measured, then, for some value  $n$  the sentence ‘this light is moving at  $n$  miles per hour relative to us’ was implied. But when those experiments are run, it happens that the speed of light is found to have the same velocity no matter whether its source is moving toward or away from us. This fact forced us to revise our understanding of light, and this involved revising the inferences we took the term ‘light’ to stand in, which inferences are, on the current account, given object-language expression in the subjunctive conditionals that articulate our comprehension of light.

The practice of revising our commitments on the basis of a conflict implicit within the inferential commitments caught up in the meaning of the terms occurring in the sentences whose use gives expression to those commitments is a process of coming to *better represent* the world in the sense that the revised inferences associated with the terms in question have been instituted by inquiry into the objects referred to by those terms. Talk of reference and representation is accorded a role in setting up and revising those inferential relations, rather than as an explanation for the truth conditions of the subjunctive conditionals that give object-language expression to those inferences. In this way a minimalist understanding of the truth conditions of the subjunctive conditional can be used, so that a representational account of their truth conditions is avoided, while at the same time the subjunctive conditional can be understood as representing facts about the kinds that are used to explain why a subjunctive is true.<sup>60</sup> Call this the *fourth grade of modal representational commitment*.

That this grade is not presupposed by the first three is shown by the fact that one can be committed to the rules of a game (e.g. chess) as rules that are stated in a declarative grammar

---

<sup>60</sup> Cf. Price’s contrast between rejecting the use of a term and revising our understanding of what it means at p.2 of (2003) and a related discussion at pp.35-40 of (2013)

(first grade), where *de re* and *de dicto* distinctions regarding the attribution and endorsement of the rules are made (second grade), and where kind terms are used in explaining why the rules apply only to certain individual objects in the game (third grade), without supposing that in the course of revising the rules of the game the players are responding to objective facts about what those rules ought to be.<sup>61</sup> Nevertheless, the fourth grade of modal representational commitment still does not institute e-representation relations that distinguish the natural from the formal sciences. To give just one example, Russell's discovery that Frege's Basic Law V led to a contradiction, by Frege's own lights, led Russell to develop a typed set theoretic hierarchy. For this reason we can say, as with the case of light, that it was something about the objects of inquiry that forced us to revise our understanding of them.

#### 5.2.4 RESPONDING TO THE CHARGE OF CONVENTIONALISM

While we have not yet arrived at e-representation, notice that at this point there is no danger of conventionalism. In saying that the use of a subjunctive or an ontic modal expresses a rule for reasoning about a given kind and its members there is no suggestion that the propriety of the rule is given by the convention that underwrites that rule in the language. Rather, the kind-sorted individuals themselves are the standard against which the propriety of a given modal profile is to be assessed, so that it is facts about the world that determine whether a given modal profile is appropriately applied to a particular kind of thing ('individual', 'world', and 'thing' understood

---

<sup>61</sup> This is not to say that debating what a game's rules ought to be will be insensitive to reasons, of course. It's just to say that in taking those reasons to be objective is, at this stage, commitment to nothing e-representational. For an appeal to a fact like "we shouldn't let every piece move as the queen does, for then the game wouldn't require much strategy" is not to be understood on the model of an appeal to a fact like the failure to find phlogiston as a reason to revise our understanding of combustion.

minimalistically, of course). The rules of chess, by contrast, are conventional. Even though those who first formulated the rules may have had to wean them of hidden incompatibilities, that process was undertaken against the backdrop of an ultimately *normative* conception governing how the players of chess ought to behave rather than an ontic conception of how the world must be. The possibility of revising the rules of a game on the basis of objective incompatibilities is a local activity, but as a game the wider context is conventional. By contrast, discovering that something does not behave as we have judged it ontically must oblige us to retract that assertion precisely because the thing itself is the standard against which the rule of inference is to be measured in a particular case. This means that it is at least in principle possible that moral and social kinds stand in factual relations that are not merely conventional—the question whose answer decides the issue is a question of whether our practices of revising our understanding of those relations are beholden to facts that are independent of our practices.

On this account, that there is a rule in some community governing a link between an observation that Mercury is in retrograde and a claim that intellectual activities will be thwarted no more makes it the case that it is *true* that Mercury being in retrograde necessitates that intellectual activities will be thwarted than the fact that someone believes P makes it the case that P is true. Even though a modal marks an inferential rule governing a link between a class of kind terms and the identity conditions of the corresponding kinds, we allow that it is the *facts about the world* that determine whether a rule ought to be present in the language. And so the propriety of the application of a concept is not hostage to the presence within the community, at a given time,

of a corresponding rule.<sup>62</sup> It is because we revise the rules of our language on the basis of a discovery of incompatibilities that the language comes to represent the world, and in that representation there is no danger of conventionalism about the basis for these rules. The response against the conventionalist charge is made from within an i-representational framework as well, so that even those domains of discourse that are not e-representational, so long as they incorporate the revision of inferential relations on the basis of an investigation into the attitude-independent incompatibilities we discover in our web of belief, will not be subject to a charge of conventionalism.<sup>63</sup>

#### 5.2.5 FROM THE FIFTH TO THE SIXTH GRADE OF MODAL REPRESENTATIONAL COMMITMENT:

##### FROM SPATIO-TEMPORAL LOCATION TO THE ‘IS’ OF CONSTITUTION

Intuitively, the distinction between the subject matter of the natural sciences and the subject matter of the formal sciences is explained by the fact that the objects of the former sciences are located in space and time whereas those of the latter are not. And with objects located in space and time it now makes sense to impute relations of denotation between the terms of the language and the objects themselves, relations that are part of the semantic machinery that explains why the

---

<sup>62</sup> While this claim can be straightforwardly made for the relationship between chemical kinds and nomological modality, as we will see in the chapters on organisms and persons the relationships among normative modality and organic kinds, deontic modality and personal kinds, and a society's conventions is more nuanced. Nevertheless, we will be able to preserve a sense in which it is not merely convention that makes the application of a modal appropriate.

<sup>63</sup> I do not propose to have decided when, in fact, our practices meet this standard, of course. Questions of explanatory power, the ability of a theory to make novel predictions, and of the evidential weight of different sorts of data will have to be factored into decisions concerning whether a representational linguistic practice is responsive to the weight of evidence in revising its rules. The point is simply that to engage in such a practice, whatever its contour, is to be speaking a language that has a right to be seen as representing the world in ways that, e.g., talk of chess and of Mercury's effect on the intellect do not, though talk of mathematics and logic plausibly do.

language means what it does. As a word-world connection established in virtue of denotation relations is that which underwrites e-representation as distinct from i-representation, this means that insofar as one represents the objects of a discourse as objects in space and time one is committed to representational relations that do not pertain to the objects of the formal sciences. This means that representation of objects in space and time is e-representation of those objects, and that e-representation distinguishes the natural sciences from the formal sciences.

By itself the claim that talk of spatio-temporal location is that which distinguishes e-representation from i-representation, and so the natural from the formal sciences, is not surprising. Nor is it terribly interesting. But talk of the spatio-temporal placement of objects makes possible talk of the constitution of wholes out of the parts that compose them, and this affords new sorts of explanation. To see that this is so, consider how claims of constitution relate members of different kinds to one another. Modalized assertions are often justified by recourse to the kinds that are talked about in those assertions, but one can ask why it is that membership in some kind explains a modal assertion. In the empirical sciences these questions are answered by a story we have of the world and its objects, a scientific image that relates what objects *are* in the sense of their identities under different kinds with what objects are *composed of* in the sense of their relations to the kinds of objects that constitute them. Relating objects of different kinds to one another by constitution affords explanation for why things do what they do. We can see this by considering an extension of the explanation introduced earlier.

Why can't this handle electrocute me?

- Because it is made of plastic.

Why can't plastic electrocute me?

- Because there are no free electrons available for the transmission of an electrical current.

Why are free electrons needed for the transmission of an electrical current?

- Because electricity is the transmission of free electrons.

This series of explanations results in an identity claim between electricity and the transmission of free electrons. But that identity claim is backed up by claims of constitution that relate the microscopic scale to the macroscopic, and in this sense the claims made at the macroscopic scale represent the objects of the world (in this case plastic) as being composed of various types of stuff. This interaction between the 'is' of identity and the 'is' of constitution, an interaction the spelling out of which is the construction of a scientific image of the world, marks off a domain of inquiry where representation-talk is warranted in virtue of spatio-temporal relations among the kinds of objects our explanations commit us to as well as causal relations between and among kinds at different levels of explanation. Call this the *sixth grade of modal representational commitment*.<sup>64</sup>

---

<sup>64</sup> Talk of constitution presupposes talk of spatio-temporal location, for to talk of one kind of object as constituting another kind is to talk about spatio-temporal relations between the constituting kind such that, when certain conditions are met, the resulting unity constitutes a whole of another kind. But talk of the spatio-temporal location of objects does not presuppose talk of constitution. A discourse concerning point-particles in space and time is possible without talking about any wholes which those particles come together to constitute. Because of this asymmetric dependence, talk of constitution is talk that goes beyond talk of spatio-temporal location.

### 5.2.6 CONSTITUTION AND MODALITY

Constitution is a relation on which one kind of object makes up another without the two being identical.<sup>65</sup> For consider what is entailed when the copula linking two singular terms is a copula of constitution. When we say ‘a is b’ where we mean ‘a is constituted by b’, one commitment we take up is that a is not identical to b. This is seen from the fact that a whole stands in different counterfactual relations than does the stuff of which it is composed—vary that stuff at all and it is a different instance of that stuff, but the whole (at least sometimes) remains what it was throughout that variation. For some a to be nonidentical to some b it follows that a and b fall under different kinds, for kinds are what settle criteria of identity and individuation for their members. Where the ‘is’ in ‘a is b’ means ‘a is constituted by b’, where a is a member of  $K_1$  and b is a member of  $K_2$  (distinct from  $K_1$ ), there must be some c that is a member of  $K_2$  such that c is not identical to b and a could be (constituted by) c. So much is entailed by the fact that the criteria of identity and individuation associated with  $K_1$  and  $K_2$  are different; for there must be some witness (c) to that difference.

But this is not yet all that constitution requires. Consider the following case, due to Gupta (1980). Suppose I am travelling by plane from New York to D.C., but that I might have travelled from New York to L.A. Airlines individuate passengers such that I am not the same passenger on the flight from New York to D.C. as I would be on the flight from New York to L.A. Call the first passenger “1076.” Call the second “8845.” At this point all of the conditions given

---

<sup>65</sup> Wiggins discusses constitution as a way of distinguishing the relation between a lump of clay and the statue it composes from the relation of identity (2001, pp.36ff.), in contrast with the argument for contingent identity given in Gibbard (1975). Fine (2003) likewise argues that objects are not identical to the matter that constitute them, and the view is defended against objections in Fine (2006).



in the paragraph above are met: I am an element of the kind ‘person’, 1076 and 8845 are elements of the kind ‘passenger’, where these two kinds have different criteria of identity and individuation, 1076 is not identical to 8845, I am 1076, and I could have been 8845. Yet it does not seem right to say I am *constituted* by 1076. Rather, being a passenger is a role I can play in some phases of my life as a person (cf. Wiggins (2001) on ‘phase sortals’, pp.33, 63). The problem with the above conditions is that while the kind ‘person’ and the kind ‘passenger’ are distinct, a passenger is a *sort* of person—a person riding in a vehicle. We can rule out these cases by requiring that in addition to the constituting and constituted kinds being distinct (having different criteria of identity and individuation), we require that the one not be a restriction or phase of the other. If we let the locution ‘ $K_1 \not\leq K_2$ ’ signify that  $K_1$  is neither identical to nor a restriction of  $K_2$ , then where  $a$  is a member of  $K_1$ , and  $b, c$  are members of  $K_2$ , the following entailment holds:<sup>66</sup>

$$a \text{ is constituted by } b \Rightarrow a \text{ is } b \ \& \ a \neq b \ \& \ \Diamond(a \text{ is } c) \ \& \ K_1 \not\leq K_2$$

Talk of constitution is talk that distinguishes the modal profiles of the constituting and of the constituted object. But this means that differences in the modal profiles of the constituted and constituting objects make it possible that organic individuals, thought of as wholes constituted by

---

<sup>66</sup> The consequent of this entailment gives a necessary condition for a copula to count as an ‘is’ of constitution, not a sufficient condition. This can be seen by the fact that where ‘ $a$ ’ is the lump of clay that constitutes some statue, it can happen that the lump is a statue, the lump is not identical to the statue, it is possible that the lump is some other statue, and ‘lump of clay’ is neither identical to nor a restriction of ‘statue’. But the statue does not constitute the lump of clay, and so the satisfaction of the consequent of the above conditional does not suffice for the obtaining of the antecedent.

parts, are such that as wholes they are purposive while their parts require only the nonpurposive causal modalities characteristic of the physical sciences.

Talk of spatio-temporal continuity enriched by the ‘is’ of constitution makes possible talk of wholes as kinds of objects whose criteria of identity and individuation differ from the criteria of identity and individuation of the parts that compose them. In this regard the ‘is’ of constitution, as against the ‘is’ of identity, enables one to relate two objects that fall under kinds that carry different modal profiles. For to say that a statue is constituted by rather than identical to a lump of clay is, among other things, to allow that while the statue could lose a hand and remain the same statue, the lump of clay could not lose that part and remain the same lump. Though the clay and the statue might occupy the same spatio-temporal region throughout all of their existence (perhaps because the two halves of the statue were shaped independently and brought together and separated only once, as Gibbard proposed), they have different criteria of identity and individuation. And as we saw in chapter 4 this difference in material rules of inference can be thought of as reflected in (expressed by) such object-language claims as ‘that object *qua* lump of clay could not survive removal of its hand, though *qua* statue it could’. This difference in the modal profiles of the constituting and constituted objects makes possible a sort of modal representationalism that will be used in the second half of the dissertation to make sense of organisms as purposive creatures whose purposiveness is naturalistically intelligible. For it will be seen that a whole organism can be thought of as purposive while holding that the organism’s constituting parts are not purposive. All that is needed for organic wholes to be purposive is that the causal powers of their parts should have a certain sort of subjunctive complexity in their relationships to one another. In this way the purposiveness of organic generation and growth can be made sense of without committing ourselves to anything other than a particular structure in the

ordinary causal relations that govern the parts of an organism that constitute it as the whole that it is. And this means that we can e-represent organic nature as purposive without running afoul of a sensible naturalism that holds that the chemical individuals that constitute organic wholes are governed solely by the causal modalities.<sup>67</sup>

#### 5.2.7 LOOKING AHEAD: FROM OBJECT-LANGUAGE USES OF THE ONTIC TO THE TELEOLOGICAL AND NORMATIVE MODALITIES

Whereas Brandom, Price, and Thomasson focus on object-language modalities of the ontic (nomological and metaphysical) varieties, I have assembled a set of conceptual resources with which to understand the object-language uses of normative and teleological modalities as well. For we are currently in possession of a view on which the use of a subjunctive conditional (in some contexts) can be understood both as expressing commitment to a rule of inference governing the use of kind terms, and as representing the world in terms of different kinds of objects and relations they stand in. With the ontic modalities understood in terms of subjunctive conditionals, these, too, can be understood to have both an expressive inferential and descriptive representational dimension. This makes possible a form of modal metaphysics of kinds, though it is a *descriptive* metaphysics, one that is aimed at articulating the commitments implicit in how we reason rather than prescribing those commitments on the basis of independent argumentation. Any metaphysical results that are downstream from this modal expressivism will be aimed at ex-

---

<sup>67</sup> It goes beyond the scope of this discussion but it is worth pointing out that in his defense of the scientific image as having a certain sort of primacy over the manifest in “Philosophy and the Scientific Image of Man” (1962) Sellars considers and rejects a view on which manifest objects are *identical* with systems of imperceptible particles and instead defends the position that they are *constituted* by them—pp.394 and 400ff.

plicating the commitments implicit in the reasoning that modality gives object-language expression to.<sup>68</sup> If it is possible to interpret the teleological and normative modalities in terms of structures of subjunctive conditionals that are explained by recourse to the kind terms that occur within them, then this modal metaphysics can be extended.

In the next two chapters I show that the ways in which we reason under teleological and normative modalities can be read as expressing more particular patterns of subjunctive robustness, now among inferences governing our use of different classes of kind terms. For by showing how to interpret these other modalities in terms of sets of subjunctive conditionals, where these subjunctives are in turn interpreted as object-language devices for expressing commitment to rules of inference, metaphysical commitments concerning what it means to be a member of various kinds can be read off the multimodal profiles under which we reason about these kinds. In this way the modal expressivism of the first half of the dissertation is leveraged in the second half in order to underwrite a teleological and normative metaphysics of the organic and personal that does not appeal to any representational commitments beyond those for ordinary objects, their causal powers, and patterns of subjunctive relations among those powers. Because the subjunctive conditional has been interpreted as an object-language expression of a rule of inference, I will in effect be arguing that our habits of thought underwrite some of our most primitive commitments concerning purposive organic activity and the mindedness characteristic of thought and complex coordinated agency. And so by the end of the second half of the dissertation it will be clear that the modal expressivism developed in the first half of the dissertation gives rise to a

---

<sup>68</sup> It is of note that at the end of §8 (footnote 22) Price himself allows that a *descriptive* metaphysics can be pursued from within his expressivism. This reinforces my contention that the perspective I have been developing mediates the debate between Price and Brandom concerning modal expressivism and modal representationalism.

project in the descriptive metaphysics of kinds that deserves to be considered alongside the representationalist modal metaphysics common in contemporary philosophy.

## 6.0 THE SUBJUNCTIVE BACKGROUND OF THE TELEOLOGICAL MODAL PROFILE OF ORGANIC GENERATION AND GROWTH

*Between the sphere of conscious purpose and the world of the inorganic and mechanical, there lies the vast realm of the organic, with its directive, creative, and regulative activities.*

E.S. Russell, *The Directiveness of Organic Activities*

*And all this vegetable world appear'd on my left Foot,  
As a bright Sandal form'd immortal of precious stones & gold:  
I stooped down & bound it on to walk forward thro' Eternity.*

William Blake, *Milton*

Talk of the organic is talk that is fraught with norm-laden and teleological terminology. We say of different organisms, depending on their particular traits and those emblematic of their kind, that they are *resilient*, *aggressive*, and *delicate*; that they are a *low-yield* or a *high-maintenance* instance of their species;<sup>69</sup> we talk of what plants and animals *need* and *want*, and we speak of their activities and traits as being directed toward various ends. Many of these evaluative predicates and modalities are also used in talk of agency as well, though the aggressiveness of a pack of wolves is rather unlike the aggressiveness of Japanese knotweed. Those who are smitten with

---

<sup>69</sup> **N.B.** Throughout this chapter I speak of 'species' and 'genera' as general categories for organic subkinds and the higher order kinds that subsume them.

the ideal of the ‘one word/one thing’ picture of language may urge that the multivocity of these terms be purged, but it is not clear at the outset that an analogical extension of one domain’s terms into another is everywhere a bad thing. Particularly in a case where one has developed a sound commentary on the categorial transposition between the two domains, it might be held that a multivocal extension of one vocabulary into another domain was an important part of conceptual progress.<sup>70</sup>

Be that as it may, I will not at the outset worry about whether the multivocity of the evaluative language used to categorize the organic world is a problem. Instead, the aim is to describe certain features of the use of that language. In order to properly separate questions of the agentive uses of these terms, which will be the focus of chapter 7, from their use in nonagentive organic contexts, I focus in this chapter and the next on teleological explanations for organic growth and generation, and more specifically on the powers found in vegetable being. Nevertheless, the comments made here are meant to apply to the nonagentive organic activities of animals (e.g. generation, digestion, respiration, growth) as well.

I set two tasks for myself in this chapter, to be accomplished in parts 1 and 2 respectively. First, I will show how the subjunctive background of organisms, the material inferential space of reasoning with organic kind terms, suffices to draw a principled distinction between the chemical and the organic orders of being. Second, I will show how to understand the subjunctive background of organic generation and growth so that talk of the *purposive* and *normative* character of that activity is intelligible. Crucially, however, that intelligibility will not rely on positing any special metaphysical character to organic activity. Instead, commitment to talk of organic pur-

---

<sup>70</sup> In my (Forthcoming c) I defend a view of analogical inference of this sort based on my analysis of Hegel’s association of third-figure syllogistic inference (hypothesis or abduction in Peirce) with inference by analogy.

positiveness on this account will involve nothing more than commitment to a certain sort of complexity among ordinary causal relations.

## 6.1 DRAWING A PRINCIPLED DISTINCTION BETWEEN THE CHEMICAL AND THE ORGANIC

### 6.1.1 THE BOUNDARY PROBLEM

Compare a star burning in space over its ‘life-cycle’ and a tomato seed germinating in the soil over the course of a typical midwestern US summer. The star will burn its stellar fuel in balancing the gravitational forces causing the star to implode with the explosive nuclear fusion of heavier elements within it. If it is of sufficient mass, gravity will eventually overcome the nuclear fusion needed to keep the star burning and it will explode into a supernova that sends the matter created in its interior out into the surrounding interstellar medium. In doing so it makes possible the births of other stars and the formation of their solar systems. As it germinates the tomato seed will draw water from the surrounding soil to metabolize its store of starch into sugars that are used to produce the root apical and shoot apical meristems—the nascent bodies that will become, respectively, the root system and the stalk, leaves, flowers, and fruit of the body. Over the summer alternating bouts of rain and sunshine fuel the growth of the plant as it draws nutrients from the soil and rain, using energy from sunlight to break them down into simpler molecular components and recombining these components into the materials it needs for its survival. As it grows its roots serve to anchor it in place and protect it against the impact of disturbances that



would tend to uproot it. Insect attacks will be warded off with the release of toxins, and other enzymes would spur the release of adenosine triphosphate (ATP) at the site of the injury so as to fuel the production of cellulose to seal the wound. If all goes well, the tomato plant will pass its own seeds back into the soil and the generation of the species will continue. It takes only a moment's reflection on ordinary habits of thought to see that teleological judgments of organic processes, marked by two-place operators like 'so that' and 'in order to' (relating means to ends), come readily to mind:<sup>71</sup> the plant grows toward the sun so that photosynthesis can occur; the mitochondria release ATP so that the wound will be healed; the stomata close at night in order to retain water; the plant produces fruit in order to reproduce. These purposes form hierarchical chains, and a large part of the organizational structure characteristic of the organism is given by the hierarchies of purpose that articulate determinate organic kinds and their place in the environment: the stomata close at night so that water can be retained; water is retained so that, among other things, hydrogen is available for the synthesis of ATP; ATP is synthesized so that fuel is available for the process of cellular construction; cellular construction occurs so that insect attacks can be healed, and so that..., etc.

In reasoning about the subjunctive space of an organism, the background of facts concerning how a member of a given kind of organism would and would not respond to variations in its environment, we find complexes of order and regularity that tend toward the survival of the

---

<sup>71</sup> The term 'so that' also has a use where the relation it marks is rational, and in such uses the term functions as an intensional conjunction meaning something like 'and for this reason'. Such uses do not in general connote a means/end connection between the sentences in the two positions of the operator. While 'cacti have barbs so that predators are deterred from eating them' expresses a function that the having of barbs plays in the life of cacti, a judgment like 'red' is a determination of the determinable 'color', so that to be red is to be colored' does not carry that connotation—being red is not of itself a means to being colored (though if there is some system that has appropriated the former state as a means to the latter then it will be). Instead, the use of 'so that' here connotes an explanatory connection between the sentences in question rather than a means/end connection. I will mostly be concerned with the nonrational teleological use of 'so that', though I occasionally use the rational operator in exposition of some other point.

individual and the perpetuation of its kind. And yet a star also tends to ‘survive’ over time in its typical environments, while stellar ‘death’ can lead to the creation of more stars. What distinction, if any, can be said to mark the apparently purposive subjunctive background of a seed from the nonpurposive background of the stars? Or must we give up this distinction and do away with talk of natural purpose so as to avoid its reification? And both the germination of a seed and the generation of a star can be contrasted with the purposive activity of a person; as with organic activity personal agency will tend to be subjunctively oriented toward various future states. But in the case of personal agency the end toward which an action is directed is at least at times represented in such a way as to furnish rules the agent represents to herself as *to be followed*. One might hope that if a method can be found to mark a distinction between stars and seeds it would shed light on what it is to be a self as well.

What is needed is some means of distinguishing purposive from nonpurposive processes in nature so as to justify our drawing that distinction where we do. Call this *the boundary problem*. To say that organic processes are naturally purposive and non-organic processes are not is true enough as a characterization of where, in practice, we draw that line. But what is needed is some principle according to which that line is drawn where it is. The problem of distinguishing organic from inorganic processes has been an ongoing concern in the history of western science (cf. the first two chapters of Brock 1993). Throughout much of the middle ages alchemists thought that metals grew in the earth. It was a genuine discovery that they did not, but what did that discovery consist in? As a first pass it might be thought that organic generation and growth are purposive precisely because they are processes that are directed toward the survival of individuals and the perpetuation of their kinds. But this does not furnish a criterion precise enough to rule out non-organic processes as purposive. For given the right level of description many

processes tend toward the persistence and generation of new members of the kinds occurring in those processes. Consider a planetary nebula prior to the formation of a central star or any of its planets. Collections of gas and the detritus of earlier stellar ‘lives’ will have ‘seeded’ the nebulae with the building blocks for the creation of a new sun and its planets. Gravitational and electromagnetic forces among the nebula will inexorably lead toward the formation of a stable system. But it seems a category mistake to think of that system as purposefully directed toward its resulting states.

This problem is exacerbated by the fact that there are occasions when teleological language is used to characterize chemical processes. We talk of the *needs* or *requirements* of both chemical and organic processes, and in both cases a teleological phrase can be used: compare ‘water needs impurities in order to conduct electricity’ with ‘plants need to retain rainwater in order to grow’. But there is a criterion for distinguishing which occurrences of this form are properly teleological. In the latter case we can drop the necessity modal and arrive at a sentence that is still apt: ‘plants retain rainwater in order to grow’. This method does not work in the former, however: ‘water is impure in order to conduct electricity’ is only felicitous if we are using water as a means to that end, but impure water does not simply of itself have that capacity as an end. Talk of the needs of a chemical process permits the use of a modal with a teleological surface grammar, but that the modal is not properly teleological is reflected in the fact that the would-be means is not, independent of its requirement as a condition on the process, a means toward that end. By contrast it is in the nature of a plant that it retains water in order to fuel its growth, and there is no need to index that end as conditioned by the means as a requirement.

A further distinction helps make clear what is going on here. The elimination of an ontic modal in the antecedent of a teleological sentence about an organism is apt only when the state

or process in the first position is part of the internal activity of the organism, something over which it exercises homeostatic control. The sentence ‘plants need rainwater in order to grow’ does not go over into ‘rain falls on plants in order to grow them’, and this is because the falling of rain is not an activity that plants exercise any control over. The organic thing is *internally* purposive—it is a unity whose parts are organized toward its ends. While the environment can furnish resources for the realization of those ends, it is not thereby made into a purposive thing. Together these observations show that the occurrence of ‘in order to’ in a sentence of the form ‘K needs  $\phi$  in order to  $\psi$ ’ signals a teleological relation only if that sentence can be replaced with ‘Ks  $\phi$  in order to  $\psi$ ’. And this condition on linguistic transformations is a reflection of the fact that the organically purposive is a function of the internal organization of individual organisms.

Though this distinction shows that in practice we distinguish purposive from nonpurposive activity, even when making use of an apparently teleological modality in both cases, it does not show that we are justified in doing so. Consider the planetary nebula again. Though it is felicitous to say ‘clouds of hydrogen need a certain amount of mass within a certain area in order to form a star’, we do not say that clouds of hydrogen *have* that mass within that area in order to form a star. True enough, this distinction helps separate purposive from nonpurposive uses of ‘in order to’. But it does not tell us whether we are justified in making those distinctions where we do. Once again we find that *in practice* we mark a distinction between purposive and nonpurposive processes, and in such a way that it divides along the organic/inorganic division, but we still do not have a principle that justifies drawing that distinction where we do.

### 6.1.2 ARISTOTELIAN AND KANTIAN RESPONSES TO THE BOUNDARY PROBLEM

Two common responses to the problem of where to draw the line between the purposiveness and non-purposiveness of nature each proceed by denying the existence of a boundary. On the one hand there is a tendency to reify purpose as a part of the cosmos itself and so assimilate even apparently non-purposive events like gravity as purposive in some limited sense (Aristotle's invocation of final cause, as standardly interpreted, stands as an exemplar here; I wish to remain neutral on whether or not this is a proper interpretation). On the other hand, some have counseled understanding teleological language in biology as convenient shorthand that does not, properly speaking, make a claim that nature is purposive (there is then a further debate concerning whether that language should—or could—be eliminated entirely). Kant is an exemplar of this second approach (this is a claim I will defend). Both of these responses to the problem deny the existence of a boundary—one by making all of nature purposive, the other by making none of it purposive. And both responses presuppose a model of the purposiveness of organic generation and growth that is *prospective*—one understands the purposive character of a process by understanding the *future states* that it is directed toward realizing. Darwinian theories of natural selection allowed philosophers to reconceive the nature of organic purposiveness by emphasizing the *retrospective origins* of purposive activity over the *prospective results* that characterize the Aristotelian and Kantian responses.<sup>72</sup> Kant's account of natural purpose can be used as a foil to frame this reconception.

---

<sup>72</sup> I discuss this shift in more detail in my (Forthcoming a).

In the third *Critique* Kant consigns the teleology of the organic world to the reflecting power of judgment. Whereas the determining power of judgment operates by subsuming an individual given in sensibility under a concept from the understanding, reflecting judgment is called into operation without a determinate concept with which to guide the imagination's synthesizing of the content given in intuition. Instead, in an exercise of the reflecting power of judgment the cognizing subject is confronted with an object (or a set of objects being compared) and searches for a concept to comprehend it (them).<sup>73</sup> Kant thinks that while we are always and everywhere under an obligation to use mechanistic explanation in treating of anything in space and time, sometimes we are unable to fulfill this obligation (5:386-8; 5:417-8). The activities of organic things are riven with such manifest coordination that we are forced we turn to purposive explanation in understanding organic activity. In doing so Kant thinks we reason as if the thing in question is designed by an artificer, so that its activities exhibit the purposiveness they do because (we reflectively imagine) it was designed with those purposes in mind. The reflecting power of judgment is operative here because, Kant emphasizes, we are not saying *of the object* that it is purposively organized; we are instead merely adopting this purposive frame for our understanding of it. Purposive explanation of the organic world for Kant is incompatible with a mechanistic explanation of it, and though we are ever obliged to pursue mechanistic explanation, we are sometimes forced into a purposive frame. This frame is merely a crutch for our cognitive shortcomings, however.

---

<sup>73</sup> Cf. the discussion of reflection in the *Vienna Logic*, 24:909ff and the *Jäsche Logic*, 9:94-95, both reprinted in Kant's *Lectures on Logic*. In the Introduction to the third *Critique* Kant characterizes the activity of reflecting judgment as an "*a priori* legislative faculty", writing

The reflecting power of judgment, which is under the obligation of ascending from the particular in nature to the universal...requires a principle that it cannot borrow from experience....The reflecting power of judgment...can only give itself such a transcendental principle as a law, and cannot derive it from anywhere else (for then it would be the determining power of judgment)...

There are three elements in Kant's account of purposiveness that I want to distinguish and discuss. First, there is its use of *end-directedness* as a way of understanding a thing's parts in terms of the functions they serve in relation to a whole organism (5:373-6; 5:408-9; 5:417-421). Second, there is purposiveness as *causal* explanation (5:359-361; 5:369-375; 5:386-388; 5:408-9; 5:440). Finally, there is purposiveness as *intentional* causality, modeled on analogy with the generation of artifacts (5:373-5; 5:390; 5:398; 5:420-421; 5:441-442; 5:464-465). All three of these features—the part-whole relationships posited by teleological explanation, the understanding of teleology as a causal force, and the interpretation of the purposiveness of organic things as mind-governed activity—are irremediably linked in Kant's mind.<sup>74</sup> Purpose in nature is modeled on purpose in the human domain, in particular on the creation of artifacts. An artificer has a design in his mind, and this design dictates how the work is to unfold—the representation of the whole, as an end, is what causally guides the operations that result in that end. Similarly, the behavior of the organic thing is so carefully counterbalanced within its environment, appropriating causal forces around it as external ends for its own internal regulation and warding off those that would destroy it, that it would seem as though the *concept* of the organic thing as the kind of thing that it is, as a whole whose parts variously contribute to its maintenance in the face of environmental forces in the way peculiar to its species, is the ground for the causal forces at work in the organism. Purposive explanation of organic nature in Kant is a peculiar kind of *intentional causal* explanation. It is also *forward-looking*, as if to understand something as purposive *just was* to understand it in terms of its later states. The categorial resources Kant uses to make sense

---

<sup>74</sup> There are, however, places where Kant tentatively broaches the subject of non-intentional purposiveness, usually in connection with idealist attempts to make sense of nature—see 5:373, 5:391-395, 5:364-365, and 5:439-40. In each case, however, Kant argues that such attempts do not “so much solve the question of the first ground of purposiveness as rather nullify it, by robbing that concept of all its reality and making it into a mere misinterpretation of a general ontological concept of a thing in general” (5:439-440).

of organic purposiveness are the categorial resources of intentional agency, in particular the resources of artifact creation.

### 6.1.3 DARWIN'S HYPOTHESIS AS A THIRD RESPONSE TO THE BOUNDARY PROBLEM

The key to breaking out of the categorial frame the third *Critique* embodies was our coming to view the *genealogical ancestry* of organic things, not their individual futures, as the source of their purposiveness. In this way we were able to frame an independent conception of the relations underwriting attributions of purposiveness to natural things, one that separated purposiveness from intentional causality. Darwin was able to reorganize our conception of the purposive character of organic activity in such a way that it was possible to draw a principled distinction between organic and nonorganic processes such that only the former were purposive. Central to this reorganization is Darwin's shift from a *prospective* understanding of organic purposiveness as directedness toward a given outcome, to a *retrospective* understanding of the natural conditions of generation and growth in organic things. By hypothesizing that variations would naturally arise across generations, and that environmental factors (including inter- and intraspecies competition) would select for certain varieties over others, Darwin made the origin of species—and the great range of species-preserving activities that organisms evince—naturalistically intelligible. In doing so Darwin made it possible to understand the purposiveness of organic activity in terms of the *causal history* of the species rather than by recourse to the future states of the organism as states that were represented by the organism, and which representations causally guided its activities.



Kant thought that the purposiveness we use to understand nature involved the attribution of a peculiar kind of causal force to organic things, and the only way Kant allowed we could understand this purposiveness was by analogy with the intentional creation of artifacts. The only understanding of end-directedness Kant was equipped for was one where the representation of an end-state was guided by a mind in causally organizing the object's activities toward that end. I put this point by saying that purposiveness in Kant is a prospective sort of explanation; he has no account of the origin of an organism's purposiveness save that it resides in the mind of an artificer who looks ahead to what will come and causes things to match this design. It is for this reason that judgments of organic purpose are reflective. Darwin showed, by contrast, that whatever representational states are needed for making sense of the end-directedness of organic growth are written into the mechanical processes of gene expression and environmental equilibration,<sup>75</sup> and that the *source* of these representations lies in the selection pressures that show up only from a *retrospective* perspective on the ancestry of the organism. Whereas Kant's notion of purpose is centered on prospective assessments of intentional results, Darwin showed us how to understand the non-intentional purposive character of organic things by reorganizing our comprehension of how, retrospectively, there *came to be* such things as these

Darwin makes available a third response regarding how to draw the line between the chemical and the organic. In addition to the Aristotelian reification of final causes and the Kantian recourse to the 'as-if' teleology of the reflecting power of judgment, both of which understand teleology prospectively, there is now the possibility of seeing purpose as present in nature in virtue of a retrospective account concerning how there came to be different kinds of purposive

---

<sup>75</sup> This is a terribly more complex matter than I am letting on here; I hope I do not butcher the point by putting it so crudely.

activity. An analysis of the teleological language of biology in terms of subjunctive conditionals has been advanced by a number of figures, and this analysis allows us to draw a principled distinction between organic and inorganic kinds.<sup>76</sup> The leading idea is that the function of an organic trait is to be understood in terms of the causal role that trait played in perpetuating instances of the kind in which the trait exists. So the fact that sperm exist at all is to be explained by the role that sperm play in fertilizing eggs, and for this reason sperm have the *proper function* (to use Millikan 1984's terminology) of fertilization. This can be true even though most sperm do not perform their function—proper function is given by the role of the trait in perpetuating its kind rather than by statistical regularity. One then explains the role of a trait in perpetuating its kind in terms of the subjunctive background of that trait's presence in nature: if earlier sperm had not fertilized eggs, there would be no sperm in existence today.

And so from a Darwinian frame there is a genuine difference between the properly organic and the merely chemical. The origin of the capacities characteristic of a star is explained by processes that do not differentially affect the survival and propagation of stars. But the origin of many of the capacities characteristic of a tomato seed is explained by the role those capacities have had in the survival of individual tomatoes and the perpetuation of the species. The organic world is a domain in which temporally later individuals have (some of) the capacities they have only because of the etiology of their kind, and had earlier members of a lineage been otherwise or had their environments been different then today's individuals would have had a different set of capacities. In this way the organic thing's activities acquire, by nature, subjunctive stabilities directed at its various ends, and these subjunctive stabilities explain the purposiveness and evalu-

---

<sup>76</sup> See, e.g., Millikan (1984, 1989, and 1993), Nagel (1977), Neander (1991), Papineau (1993), Wimsatt (1972), and Wright (1973 and 1976). Buller (1998) provides a helpful survey. See Cummins (2002) for a dissenting view.

ative character of organic generation and growth (notice the language of ‘because’ and ‘explanation’ throughout this paragraph). In this way we can draw a principled distinction between properly teleological activity and the merely mechanical activity of the chemical world.

These etiological accounts of the traits that are judged under normative and teleological modes justify the use of that language by providing a *retrospective* analysis concerning how there came to be organic traits with various functions. But in addition to the retrospective analyses that justify the use of evaluative language by recourse to evolutionary history, that language also plays a *prospective* role in implicating sentences regarding how an organic trait would and would not be actualized at different contexts. Prior to the advent of a Darwinian understanding of the retrospective dimension of teleological explanation in biological generation and growth, that prospective dimension was the only one available. The prospective dimension of teleological explanation was modelled on agency, however, and this made teleological explanations in biology look specious, as though they commit us to attributing mindedness to the growth of plants.

The problem facing Kant can be spelled out in terms of the *representational commitments* he supposes one takes up in using teleological language to describe natural processes. To describe an event as purposive is, for Kant, to represent it as if it is causally guided by a representation of the end toward which the event is tending. But because Darwinian explanation underwrites a novel *retrospective* understanding of the origins of organic purposiveness we can use the *prospective* dimensions of teleological language without fear that in doing so we reify nature as

an intentional agent.<sup>77</sup> In part 2 of this chapter I will argue that we can use teleological explanations of the organic world without even the appearance that in doing so we are representing the organic world as itself the sort of thing that changes over time on the basis of future-oriented representational states.

## 6.2 ON THE PURPOSIVE CHARACTER OF ORGANIC GENERATION AND GROWTH

### 6.2.1 COLLECTING A SET OF EXPLANATORY DESIDERATA

The aim in this portion of the chapter is to give a subjunctive interpretation of the use of teleological language in reasoning prospectively about the future states of organisms. To do that, we must have in hand some account of the roles that teleological explanations play in guiding our expectations of how organic things behave. By the analysis given in the first part of this dissertation, to identify a structure of subjunctive conditionals sufficient to explain the prospective dimension of teleological modality would be to identify a pattern of inference that governs our reasoning about organisms and their parts, so that this would be a working out of a descriptive metaphysics for the organic world.<sup>78</sup> In the rest of this section I collect four features of purposive organic activity that the account to follow will address.

---

<sup>77</sup> We cannot simply dismiss the prospective dimension of teleological explanation and focus only on the retrospective, save at the cost of both ignoring an important role of teleological explanation and supposing that early chemists, who did not have this retrospective explanation at hand, were *groundless* in distinguishing the chemical from the organic.

<sup>78</sup> Notice the ‘and for this reason’ use of ‘so that’ here. It is of note that one can turn this sentence into one with a purposive use of ‘so that’ by removing the first clause, opening with a statement of intent, trading the first subjunctive ‘would’ for an ‘in order to’, and trading the second subjunctive for a ‘will’:

Consider a pepper plant growing in one's yard over the course of a midwestern U.S. summer, and imagine the various influences the environment will have on the plant over that time. Alternating bouts of rain and sunshine fuel the growth of the plant as it draws nutrients from the soil and rain, using energy from sunlight to break them down into simpler molecular components, and recombines these components into the various materials it needs for its survival. As it grows its roots serve to anchor it in place, protecting it against the impact of disturbances that would tend to uproot it. Insect attacks will be warded off with the release of toxins, and other enzymes will spur the release of adenosine triphosphate (ATP) at the site of the injury so as to fuel the production of cellulose to seal the wound. The presence of a neighboring squash plant, whose leaves threaten to crowd out the sunlight available to the pepper, induce the pepper plant to branch its leaves away from the squash; pulling back a leaf from the squash, one sees the pepper plant's growth on that side is disproportionately tending away and out from under the squash leaf. If all goes well, the pepper plant will flower and after pollination will produce its fruit. In this way a new generation of pepper plants is made possible. Contrast this activity with the influence that the environmental forces of a midwestern summer would have on a bag of charcoal left exposed to the elements. The environmental impact on the bag is, from our middle-realm vantage, much less interesting than the impact on the plant. But this is not merely an artifact of our vantage, for the forces that affect the constitution of that bag as it degrades over the summer are far fewer in number than those governing the activities of the plant over that period. And while the charcoal would sustain a sizable flame for a while if ignited, the forces bound up in the pepper plant's activity are, in terms of their organization, much more impressive. The

---

I will outline such a structure of subjunctives in order to identify a pattern of inference that governs our reasoning about organisms and their parts, so that this will be a working out of a descriptive metaphysics for the organic world.

computational complexity needed to understand the organic thing is not an artifact of our thought; it is instead a feature of the world that our thought, if it is so much as to be able to recognize an organism as the kind of organism it is, must make itself responsible to.

Put simply, the organism is a thing that appropriates and wards off the causal influences of its environment, making use of some of those forces as means toward the ends of its existence, and staving off those that would threaten its ends. Through this activity the organism is homeostatically organized along hierarchies of feedback and self-regulation. Above all, this organization is oriented toward the survival of the individual and the perpetuation of its kind. Explicitly teleological characterizations of the activities of the organism come readily to mind, and we often embed other modalities within these teleological contexts. The plant grows toward the sun so that photosynthesis can occur; the mitochondria release ATP so that the wound will be healed; the stomata close at night so that water will be retained; the plant produces fruit so that the kind can continue. The ontic and temporal modalities within these teleological contexts mark out the various ways the organism's purposes can and will be realized. These purposes form hierarchical chains, and a large part of the organizational structure characteristic of the organism is given by the hierarchies of purpose that articulate determinate organic kinds and their place in the environment: the stomata close at night so that water can be retained; water is retained so that, among other things, hydrogen is available for the synthesis of ATP; ATP is synthesized so that fuel is available for the process of cellular construction; etc. All but the simplest organisms are characterized by the sort of organization that, by being embedded in complex systems of homeostatic feedback appropriating the various environmental forces characteristic of the organism's form of life, permit ranges of success and failure at reaching these goals. For this reason the organism can be excellent and defective in ways that are categorially out of place in anything

but a metaphorical discussion of the inorganic (a defective volcano is defective only by courtesy). While inorganic molar objects can be such that their existence and non-existence occurs in degrees or stages (consider again the charcoal), the flourishing and perishing characteristic of organic existence and non-existence is unlike the mere existence and nonexistence of the chemical. And because the purposive hierarchy characteristic of the organism has the perpetuation of its kind as an apex, the relationship between the organic individual and its kind is unlike that of the merely chemical. Additionally, we distinguish the purposiveness of those activities internal to the organism from the nonpurposive availability of the external forces that make those activities possible. Though plants grow toward the sun so that photosynthesis can occur, it is not the case that sunlight shines on plants so that photosynthesis can occur. And we can make more fine-grained distinctions in determining what is and is not organically purposive, for while it is not generally the case that nitrogen is present in soil so that plants can fuel their growth, the symbiotic relationship between legumes and the nitrogen-fixing bacterium *Rhizobia* means that in cases where decaying *Rhizobia*-infused legumes have released nitrogen that has then fueled the growth of more symbiotic pairs it does seem reasonable to say that here nitrogen *is* present in the soil so that plants (or at least legumes) can fuel their growth.

We now have a range of features of organisms and their activities that call for purposive and normative judgments. I summarize these features as desiderata that an account of the subjunctive reasoning expressed by the use of teleological and normative modalities must be able to satisfy if subjunctive reasoning is to be understood as the explanatory ground of modal judgments about the organism:

**Homeostasis:** How does the subjunctive space of the organism explain why talk of homeostatic organization is apt?

**Hierarchy:** How are the hierarchical purposes of the organism reflected in its subjunctive space?

**Survival and Reproduction:** How does the organism's subjunctive space explain why individual survival and perpetuation of the kind are preeminent organic ends?

**Directed and Nondirected Activity:** How does an organism's subjunctive space permit us to distinguish organic activity, as directed toward the satisfaction of organic purposes, from the nonpurposive environmental forces that are appropriated by the organism?

## 6.2.2 INTRODUCING ORGANISM-ENABLED SUBJUNCTIVE STABILITIES

The key notion in addressing these desiderata is found in the idea of *organism-enabled subjunctively stable relations* (OESS relations) among different organic and inorganic activities and states of affairs. The next few sections spell this idea out in some detail. I begin with simple teleological judgments such as “plants grow toward sunlight so that photosynthesis can occur”, “cellulose is synthesized at the plasma membrane so that new cells can be produced”, and “pollen is loosely attached to the stamen so that it can be easily released.” I represent the general form of such judgments as ‘ $\phi$  so that  $\psi$ ’. Call the sentence in the first position of such judgments the *means* and that in the second the *end*. I use Greek letters as placeholders for organic means and ends, with the exception of ‘ $\alpha$ ’ which will be a schematic letter ranging over the organisms



whose purposes are under consideration. In general it is subjunctively stable relations between an organism and its parts as it responds to environmental forces (and its own internal states) that are of interest in determining a set of OESSs, and so I will in general be focused on sentences that represent an organism as active in some way.

To begin with, in a teleological judgment about the activities of an organism the means tends to be *subjunctively stable*—in a variety of different situations the plant would grow toward the sunlight and it would synthesize cellulose at the plasma membrane, and knowing when it would do so is a condition on understanding how the plant will behave. Where ‘ $(\alpha)\varphi$ ’ represents the organism  $\alpha$  as active in the event of  $\varphi$  we have:

$$A > (\alpha)\varphi$$

$$B > (\alpha)\varphi$$

$$C > (\alpha)\varphi$$

.

.

.

The means is not subjunctively robust under any supposition, however; for if the plant is early on overcrowded by the plants surrounding it, then it will not have sufficient energy to grow toward the sunlight or to store the glucose needed for cellulose formation. From the standpoint that modalities mark patterns across the subjunctive background of different kinds, the fact that an activity can be directed toward an end it does not realize, and that a normatively modalized property attribution admits of exceptions, indicates that the subjunctive conditions expressed by these

modals will be more complex than the background of ontic modal property attributions. While an ontic modal property attribution can be interpreted as an expression that the property in question would be had under any subjunctive supposition, that is precisely *not* the case with a normative or teleological modal property attribution. The different inferential profiles of these modals, then, suggest that we should expect a more complex subjunctive background for organic activity if the subjunctive background is to be that which grounds the modal facts of organisms. Because the subjunctive conditional does not universally permit strengthening of the antecedent, it can happen that a given condition which on its own would lead to the realization of the means is such that together with other conditions it would *not* realize the means. And yet it can happen that if this dual condition is joined with a third, the means would be realized, and so on.

Consider a pepper plant and the growth of some one branch and leaf. If the pepper plant has been planted in a part of the garden that affords ample sunlight the plant would see to it that the leaf grows in such-and-such a direction (which, as it happens, is toward the sun). But if the pepper plant has been planted in a part of the garden that affords ample sunlight and a squash plant overcrowds it, then it is not the case that the plant would see to it that the leaf grows in that direction. But if the pepper plant has been planted in a part of the garden that affords ample sunlight and a squash plant overcrowds it, then the pepper plant would grow away from and out from under the squash plant (where the second occurrence of ‘the pepper plant’ in this sentence is in an active aspect). And if the pepper plant has been planted in a part of the garden that affords ample sunlight, and a squash plant overcrowds it, and the pepper plant grows away from and out from under the squash plant, then it would be the case that the pepper plant’s leaf grows toward the sun. With ‘D<sub>1</sub>’, ‘D<sub>2</sub>’, etc. as various *defeaters* for an organic means and ‘E<sub>1</sub>’, ‘E<sub>2</sub>’,

etc. as various *enablers* of that means, the structure of the organism-enabled subjunctive stability of the means is of the following form:

$$A > (\alpha)\varphi$$

$$(A \& D_1) > \neg(\alpha)\varphi$$

$$(A \& D_1) > (\alpha)E_1$$

$$(A \& D_1 \& (\alpha)E_1) > (\alpha)\varphi$$

$$(A \& D_1 \& (\alpha)E_1 \& D_2) > \neg(\alpha)\varphi$$

$$(A \& D_1 \& (\alpha)E_1 \& D_2) > (\alpha)E_2$$

$$(A \& D_1 \& (\alpha)E_1 \& D_2 \& (\alpha)E_2) > (\alpha)\varphi$$

.

.

.

$$B > (\alpha)\varphi$$

$$(B \& D_3) > \neg(\alpha)\varphi$$

$$(B \& D_3) > (\alpha)E_3$$

$$(B \& D_3 \& (\alpha)E_3) > (\alpha)\varphi$$

.

.

.

As enzymes are catalysts mediating various biological processes in the service of maintaining the homeostasis of the organism, it will be in enzymatic activity that the subjunctive fine structure of

organic growth and reproduction will often be marked out. Even though in the presence of sufficient nutrients the plant would see to it that glucose was stored for the creation of cellulose, if the right proteins are not present at the plasma membrane then cellulose will not be formed. But in such a situation the activities of enzymes would synthesize the proteins necessary for realizing the means of cellulose formation.

A word of caution. According to the updating function that interprets the subjunctive conditional as introduced in part 2 of chapter 2, the conditionals

$$(\alpha)\phi \& D > \sim(\alpha)\psi$$

$$(\alpha)\phi \& D > E$$

$$(\alpha)\phi \& D \& E > (\alpha)\psi$$

are jointly derivable at a context just in case the context arrived at by the supposition  $(\alpha)\phi \& D$  is incoherent—for if the nearest  $(\alpha)\phi \& D$  is a  $\sim(\alpha)\psi$  context and an E-context, while the nearest  $(\alpha)\phi \& D \& E$ -context is a  $(\alpha)\psi$  context, then the nearest  $(\alpha)\phi \& D$ -context is a  $(\alpha)\psi \& \sim(\alpha)\psi$ -context. To avoid this result the consequents of these conditionals need to be distinguished, e.g. by indexing the events they refer to according to their temporal occurrences. In this way these incoherences are avoided. But as the explicit marking of such indices would add needless complexity to the notation, I suppress it in what follows.

In addition to the subjunctive stability characteristic of the means as an activity or state that tends to be realized in the life of the organism, there also tends to be an *organism-enabled subjunctively stable covariation* between the means and the end. If the plant were to grow toward the sunlight then photosynthesis would occur; if cellulose were synthesized at the plasma

membrane then cell formation would occur. Where the antecedent and consequents range over events in which the organism is agent and patient, so that the OESS in question is that of an organism-enabled subjunctively stable co-variation between a means and an end, the basic structure of such an internal connection among organic processes consists of four conditions:

$$(\alpha)\phi > (\alpha)\psi$$

$$(\alpha)\phi \& D > \sim(\alpha)\psi$$

$$(\alpha)\phi \& D > (\alpha)E$$

$$(\alpha)\phi \& D \& E > (\alpha)\psi$$

The specific instances of this structure, with various defeat and enabling conditions, give the specific subjunctive background of a particular organic activity.

But just as the conditions for realizing a means are not subjunctively stable under every strengthening of the antecedent, so is the subjunctive stability between the means and the ends not stable under every such strengthening. And yet if there are various ways in which the obstructions between the means and the end would be offset by the activation of subsidiary mechanisms within the range of the organism's activities, the subjunctively stable covariation between the means and the end will be preserved:

$$(\alpha)\phi > (\alpha)\psi$$

$$((\alpha)\phi \& D_4) > \neg(\alpha)\psi$$

$$((\alpha)\phi \& D_4) > (\alpha)E_4$$

$$((\alpha)\phi \& D_4 (\alpha)E_4) > (\alpha)\psi$$

.

.

.

If a region of cells needed repair then ATP from the mitochondria would be sent into the intercellular space; but if a region of cells needed repair and there was not sufficient ATP in the mitochondria then no ATP would be sent into the intercellular space; but if a region of cells needed repair and there was not sufficient ATP in the mitochondria and water was available for hydrolysis and the creation of new ATP then ATP would be sent into the intercellular space... Here it is evident that talk about a subjunctively stable *causal* relation between means and end is not apt; for in the cases where  $\phi$  is realized, its activity inhibited by some other influence, and an ancillary mechanism activated to realize the end, there need be no direct causal link between the means and the end. And if the means is only one among many ways that the organism can realize its end then the following sort of situation will hold:

$$\neg(\alpha)\phi > \neg(\alpha)\psi$$

$$\neg(\alpha)\phi > (\alpha)E_5$$

$$(\neg(\alpha)\phi \ \& \ (\alpha)E_5) > (\alpha)\psi$$

.

.

.

In this structure of the subjunctive background of the organism we see the *plasticity* condition on organic activity—the organism is a thing whose ends are realized by a variety of means. Again, enzymatic activity will be a key point of orientation in the specifics of a given case.

### 6.2.3 PUTTING OESSs TO USE

Our first desideratum can now be addressed:

**Homeostasis:** How does the subjunctive space of the organism explain why talk of homeostatic organization is apt?

Homeostatic organization is evidenced by the various subjunctive stabilities between the means and ends of organic activity. There are various avenues by which, in the face of a need for ATP to fuel the processes of growth, ATP would be created and distributed through the system; it is in the manifold variety of such subjunctive stabilities that homeostasis is achieved in the organism, and the organizational character of this homeostasis is represented in the fact that various processes work together toward higher-order purposes. These simpler processes will then inherit their purposiveness from the role they play in maintaining these subjunctive stabilities. Growth toward the sun, for instance, is an activity that will exhibit a wide range of organism-enabled subjunctive stability—in a variety of conditions of defeat the organism will adjust itself to realize this end. An activity like the transfer of electrochemical energy from chloroplasts to successive structures in a plant, however, may not be subject to such subjunctive stability. While it is the large-scale organism-enabled subjunctive stabilities that are primary when it comes to understanding the purposive character of an organism (for it is these which collectively exhibit the organism as a thing which equilibrates itself in its environment as a means to achieve its various

ends), we can ground teleological judgments about organs and activities having a simpler subjunctive profile in the role they (the judgments) play in marking off processes that maintain these large-scale stabilities. Such simpler organism-enabled activities are derivatively purposive, inheriting their teleological character from their place in these large-scale organism-enabled subjunctive stabilities.

This brings us to our second desideratum:

**Hierarchy:** How are the hierarchical purposes of the organism reflected in its subjunctive space?

To address this question, let us first summarize the subjunctive structure mapped out above. When  $\phi$  occurs so that  $\psi$  will occur, we have 1) that the means is an organism-enabled subjunctive stability, and 2) that there is an organism-enabled subjunctively stable covariation between the means and the end, corresponding to a *persistence* condition on the activities of the organism, and 3) an organism-enabled subjunctively stable realization of an end in the presence of the defeat of a given means (corresponding to a *plasticity* condition):

**1) Means as an organism-enabled subjunctive stability:**

$$A > (\alpha)\phi$$

$$(A \ \& \ D_1) > \neg(\alpha)\phi$$

$$(A \ \& \ D_1) > (\alpha)E_1$$

$$(A \ \& \ D_1 \ \& \ (\alpha)E_1) > (\alpha)\phi$$

.

.

.



$$B > (\alpha)\phi$$

$$(B \ \& \ D_2) > \neg(\alpha)\phi$$

$$(B \ \& \ D_2) > (\alpha)E_2$$

$$(B \ \& \ D_2 \ \& \ (\alpha)E_2) > (\alpha)\phi$$

.

.

.

**2) Organism-enabled subjunctively stable covariation between means and end (Persistence):**

$$(\alpha)\phi > (\alpha)\psi$$

$$((\alpha)\phi \text{ and } F) > (\alpha)\psi$$

$$((\alpha)\phi \text{ and } G) > (\alpha)\psi$$

.

.

.

**3) Organism-enabled subjunctively stable realization of an end in the presence of the defeat of a given means (Plasticity)**

$$\neg(\alpha)\phi > \neg(\alpha)\psi$$

$$\neg(\alpha)\phi > (\alpha)E_4$$

$$(\neg(\alpha)\phi \ \& \ (\alpha)E_4) > (\alpha)\psi$$

.

.  
 .

To encode the ability of teleological judgments to chain (the stomata close at night so that water can be retained; water is retained so that hydrogen is available for the synthesis of ATP; ATP is synthesized so that fuel is available for the process of cellular construction; etc.), there must be subjunctive covariation between the realization of a given activity's end and the realization of some further end for which the former is a means. What this indicates is that the organism-enabled subjunctively stable covariation between a means and an end at one stage must be part of the organism-enabled subjunctively stable realization of a means at some further stage. If ( $\phi$  so that  $\psi$ ) and ( $\psi$  so that  $\chi$ ), for instance, then the end ( $\psi$ ) of the lower order process will be an organism-enabled subjunctively stable means of the higher order end ( $\chi$ ). And so the organism-enabled subjunctively stable covariation between  $\phi$  and  $\psi$  at the lower level is (part of) the organism-enabled subjunctively stable means of  $\psi$  at the next level. If the lower order means ( $\phi$ ) is the only way of realizing the higher order means ( $\psi$ )—i.e., if there is a strong organism-enabled subjunctively stable covariation between the *failure* of the means and the absence of the end—then the earlier stage's subjunctive stability between  $\phi$  and  $\psi$  will exhaust the content of the subjunctive stability of  $\psi$  as the means of the higher-order process; otherwise, additional subjunctive conditionals will articulate the ways in which  $\psi$  can be realized without having been realized by  $\phi$ , though these are only introduced at the next level as it is only here that they are relevant for the realization of the higher-order end.

We now have the same subjunctively stable structure between  $\psi$  and  $\chi$  as there was between  $\phi$  and  $\psi$ , with determinate instances of these schemata specifying the ways in which the

end would and would not be realized by the means and various ancillary mechanisms of the organism's form of life. Furthermore, we will have bundles of lower-order purposive relations tending toward the subjunctive stability of higher-order purposes. Thus, the organism-enabled subjunctive stabilities relating the drawing of nutrients from the soil and the molecular breakdown of those nutrients via hydrolysis; between chloroplast formation and photon transfer in photosynthesis; and between the intake of carbon dioxide and the oxidation of glucose in respiration, all in turn are means toward the organism-enabled subjunctive stability of ATP formation. The formation of ATP in turn is, together with other cellular processes, subjunctively stable toward the process of cellular growth. Just as the organism-enabled subjunctively stable covariation between the means and the end at one stage becomes (part of) the organism-enabled subjunctively stable conditions for the satisfaction of the means at the next, so too do bundles of organism-enabled subjunctively stable covariations between these higher order means and a further end become (part) of the organism-enabled subjunctively stable conditions for the satisfaction of still higher means. In this way the hierarchical character of the purposive organization of the living thing is embodied in the subjunctive conditions of its existence.

In turning to the next desideratum:

**Survival and Reproduction:** How does the organism's subjunctive space explain

why individual survival and perpetuation of the kind are preeminent organic ends?

we can point to the fact that at each stage of this hierarchy there are, in addition to the subjunctive structure mapped out above, sets of subjunctive stability between the satisfaction of the organism's ends and the flourishing of the individual and the reproduction of the species. When asked why the pepper plant overcrowded by the squash looks so withered when compared with its neighbor, we explain that it was not able to take advantage of the sunlight it needs to flourish.

More generally, we answer that without sunlight a pepper plant would perish. Such explanations are available all the way up the hierarchy of the organic thing's purposive structure:

**4) Subjunctively stable covariation between the end and the flourishing of the individual:**

$\neg(\alpha)\psi > (\text{organism perishes})$

$\neg(\alpha)\chi > (\text{organism perishes})$

.

.

.

Similar explanations relate the ends of the organism to the flourishing of its species:

**5) Subjunctively stable covariation between the end and the propagation of the species:**

$\neg(\alpha)\psi > (\text{species perishes})$

$\neg(\alpha)\chi > (\text{species perishes})$

.

.

.

Of course, depending upon the availability of other means of satisfying a given end these subjunctives will exhibit variation in the satisfaction of the consequent depending on how the antecedent is strengthened, with such strengthening-dependent variation articulating the determinate

ways in which its purposive activities contribute to its and its kind's flourishing. But because at every stage the satisfaction of an end is subjunctively covariant with the flourishing of the individual and its kind, the preeminent role for individual survival and propagation of the species is likewise encoded in the subjunctive space of organic activity. All the way up the hierarchy these ends are conditions on the flourishing of the individual and the perpetuation of its kind, indicating that the manifold activities of the organism are directed toward these ends at every stage of its organization. Because that is so, grasp of these conditions is particularly important for understanding and explaining what the organism is liable to do in various situations (knowing that plants grow toward the sun so that photosynthesis can occur, and knowing that the realization of this end is a condition on the flourishing of the plant, I can anticipate how plants will respond to overcrowding). The ends of individual survival and perpetuation of the kind are preeminent precisely because it is they which stand at the top of the explanatory hierarchies that govern our understanding of individual organic things.<sup>79</sup>

Up until this point we have been considering the subjunctive profile of the lives of individual organisms, but with a consideration of the role that the realization of various individual ends play in the flourishing of the species we must now consider the subjunctive space of an organism's heredity. And this permits us to introduce a range of judgments concerning the functions that organic parts and activities have, and so to normatively evaluate those parts and activi-

---

<sup>79</sup> Notice that there is nothing incoherent in the thought that these purposive apices can sometimes come apart—that which is an end for the perpetuation of the kind may require an activity that tends toward the death of the individual (consider the fact that the female of some insect and arachnid species sometimes eats the male during or immediately after copulation). This feature of the subjunctive space of organic kinds will be important when considering institutions, after the subjunctive structure marked out in this chapter has been transposed into the domain of agency in the next—for institutions, too, can be so constituted as to be directed toward incompatible ends, though in the case of institutions there is a defect in this sort of situation that the rational powers of agency can in principle (and ought in practice) overcome. No such principled or practical conditions need or ought be present for a merely organic thing, however.

ties against their functions, regardless of how any individual part or activity behaves. To begin with, we can explain how an organic activity or part in a particular individual can be directed toward or have as its function some end state  $\psi$  without it being the case that the activity or part will realize that end in that individual. Chloroplasts are green so that sunlight will induce photosynthesis, and a chloroplast has that end as its function even though, perhaps due to some genetic defect, it is unable to do so. In such a situation we judge that the chloroplast, *qua* having its role in the organism's life, ought to be engaging in photosynthesis even though it cannot. To see why this judgment is apt, and so why we are licensed to judge that the chloroplast which is unable to engage in photosynthesis is defective, consider how we might answer the question "why ought it be the case that the chloroplast engage in photosynthesis?" A ready answer to this question is that this is what plants of this species need to do in order to survive. In spelling out this answer we turn to the subjunctive background not of the individual by itself, but of the individual as the member of an ancestral line. Because the individual organism is a member of a line of descent for which the realization of that end has been subjunctively covariant with the survival of the members of that line, that individual's activity (or its parts) can have an end (or a function) that cannot be realized in an individual case. And because the strong normative modal operator does not obey the T schema (i.e., from "it ought to be that  $\phi$ " we cannot infer " $\phi$ "), the inferential role of normative predicates like "is excellent" and "is defective" makes them apt for expressing these purposive conditions.

Via the organism's subjunctive space we can also make a variety of distinctions within our discourse about the functions of organic things. We have already seen that an organism-enabled subjunctive stability is a condition on a putative means being a genuine means. The role that decaying leaves play in supplying nutrients to plants, or the role that hydrogen bonding plays

in hydrolysis, are not *means* to an organism's ends, even though they are *causal conditions*, precisely because the organism exerts no control over these activities. This absence of control is encoded in the organism's subjunctive space—while it is true that if hydrogen bonding did not occur in the way that it does the organism would not engage in hydrolysis, because the organism does not itself exert any control over that subjunctive stability it is not appropriate to characterize this feature of the organism's conditions of existence as a feature directed toward the organism's existence. Hydrogen bonding is instead a causal condition appropriated by the organism for its purposes without itself being directed toward those purposes.

With the introduction of the subjunctive space of the organism's ancestry we are now in a position to explain how an organ or activity could have a function despite, in a particular case, that function never being realized. It is the causal role that an organ or activity has had in the propagation of the species that specifies that organ or activity's function. Hearts have the function of pumping blood because it is this activity that is subjunctively covariant with the survival of past individuals and so their propagation of the species. We can also distinguish the operations of a part or activity that are its functions from those that are mere side effects. The heart has as its function the circulation of blood and not the sound its beating makes because the former but not the latter has been subjunctively covariant with the survival of the individual and the perpetuation of its kind. While the sound of a beating heart may in some situation function *as* a means toward the survival of the organism (e.g. in doctor's examinations), that derived function is not a function the heart *has* unless doctor's examinations become sufficiently reliably covariant with the survival of individuals as to induce a subjunctive stability between them.

Finally, we can distinguish defects that are due to an internal failing of the organism and its capacities from those that are due to a shortcoming in the environment. We might call the

first an *intrinsic defect* and the latter an *extrinsic* or *contingent* defect. That these are two different sorts of defect is seen by a difference in their subjunctive robustness. Had the organism been placed in an environment with different resources, its extrinsic defect would not have been present. But even in an ideal environment an organism would still suffer from an intrinsic defect. By considering the subjunctive space of the organism's ancestry, then, we can explain a range of functional and normative judgments about the activities and parts of organic things.

Our fourth desideratum was:

**Directed and Nondirected Activity:** How does an organism's subjunctive space permit us to distinguish organic activity, as directed toward the satisfaction of organic purposes, from the nonpurposive environmental forces that are appropriated by the organism?

We want to rule out teleological judgments like "sunlight shines on plants so that photosynthesis can occur" and "nitrogen is present in soil so that plants can fuel their growth." We wanted to show that the subjunctive background of the organism could both rule out these judgments in general, and permit the latter in cases where the decay of *Rhizobia*-infused legumes led to an increase in nitrogen in the soil. Pretheoretically expressed in teleological language, these judgments are ruled out on the basis of the fact that the sun's illumination of the earth and the presence of nitrogen in the soil is not the sort of thing that is *directed toward* the growth of plants. For this judgment to be grounded in subjunctive reasoning it must be the case that some subjunctive conditions present in genuine cases of organic teleology are absent here, or *vice versa*. We have already seen the beginnings of an answer to this question in pointing to the need for an organic thing to exert control over a process for that process to be part of its purposive structure. Decaying leaves and hydrogen bonding are not directed toward the growth of plants because



these activities are not organism-enabled subjunctive stabilities. More generally, there is nothing about the realization of the putative ends of photosynthesis or plant growth that explains why the sun shines, why nitrogen is in the soil, why leaves decay, or why water exhibits the hydrogen bonding it does. The putative end (plant growth) is not explanatory of the putative means, but such a relationship is one of the hallmarks of a teleological explanation. The absence of that explanatory relation is in turn exhibited in the fact that were there to be no photosynthetic activity or plant growth, there *still would be* a shining sun and nitrogen in the soil. But, as we have seen, the realization of a means  $\psi$  at a given stage is subjunctively covariant with the realization of some earlier means  $\phi$  that was directed at  $\psi$  as its end. Where there is no earlier stage in the activities of the organism that led to some putative means as an end of its other activities, there is no explanatory relation between the putative means and its putative end, and so there is no question of that putative means as a genuine means. While there is an explanation for the fact *that* there are decaying leaves that adverts to prior organic activities, there is no explanation for *why* the leaves decay that adverts to those activities, for leaf decay is not under the control of the organism. That putative means may be a causal precondition on the purposive activities of an organism, a first link in a chain of causal forces the organism appropriates for its own ends, but it is not itself purposively directed at those ends. And when there *is* an apparently purposive relationship between, e.g., nitrogen in the soil and the growth of plants, as with the symbiotic relationship between legumes and the nitrogen-fixing bacterium *Rhizobia* in their roots, then this, too, will be reflected in the surrounding subjunctive space: the release of nitrogen into the soil through the decay of earlier legumes has as an end the growth of legumes precisely because that

activity *is* subjunctively dependent upon earlier realizations of that end.<sup>80</sup> Were there no earlier legume/*Rhizobia* pairs in the area, there would be no (or not as much) nitrogen in the soil right now.<sup>81</sup>

#### 6.2.4 ON REPRESENTING NATURE AS PURPOSIVE

If this account of the role of teleological judgments of nature as means of expressing commitments concerning the structure of the subjunctive background of organic activity is adopted, then there is no threat that the use of teleological judgments of nature will illicitly represent organic nature as a domain that *itself* represents different ends as prospective goals toward which its activities are directed. Perhaps DNA coding is best construed in information-theoretic terms that involve genes representing the production of certain proteins. That is a question we can leave open for now. The point is that save in the (possible) special case of DNA coding for proteins, there is no need to suppose that in representing an organic activity as directed toward an end (e.g. hydrololysis and the production of ATP) we are representing that process as *itself* one that is representing the end in question. Adopting a minimalist understanding of representational commitment, to ascribe purposes to nature by issuing teleological judgments is, simply as such, to repre-

---

<sup>80</sup> To determine whether that activity is directed at the growth of other plants, and not merely the legumes that support its occurrence, or is rather just a consequence fortuitous for those other plants, we would have to determine whether there is a subjunctively stable covariation between the life cycles of other plants and of the bacteria-supporting legumes. If those other plants provide some kind of support for the life cycles of legumes then the symbiotic relationship will extend to include them as well.

<sup>81</sup> This raises the question of how to think about the first generation of legume/*Rhizobia* symbiosis—was the nitrogen fixation at that point directed toward the growth of plants? In the grips of my theory I am inclined to say it was not, and that it is only when this activity has contributed to the growth of a future generation of such symbiotes that the activity should be said to be purposively directed toward that end, for it is only at the second generation that we have the subjunctive conditions that underwrite talk of purposiveness. In the first generation that symbiosis is a fortuitous happenstance, like the wind which happens to deposit a seed in fertile soil. Though the growth of the seed is dependent upon the wind's activity, plant growth has not itself affected the wind's behavior. Only when an event is itself differentially covariant with the ends of the organism is the event a means to those ends.

sent nature as purposive. By the grades of representational commitment discussed in chapter 5, so long as the practice of determining and revising our understanding of nature's purposes exhibits the right kind of attitude-independence, ascribing purposes to organisms will fall within the remit of science. But on this view when we represent an event as purposive, as directed toward some end, we do not represent the event as one in which a representation of that end is occurring. There need be no attribution of representation when we represent natural purposes—instead, we are representing that a certain *structure* holds across ordinary electro-chemical and mechanical events, none of which are (individually or collectively) themselves representing the world (again, save in the possible case of DNA transcription of proteins).

Of course when it comes to explaining animal behavior there will be points at which our representing an activity as purposive *does* involve an attribution of representational states—e.g. when the hawk strikes at its prey. That issue will be upon us in the next chapter, as there it will be important to distinguish the representation of a purposive event as itself one in which an end is represented, and representation of a purposive event as one in which the end is represented *as an end*, as that which stands as a rule to guide action in seeing to its realization. For now the subtleties of sentient versus sapient activity, the division between mere animals and persons, is not at issue; the present remarks concern only the domain of organic generation and growth, and here we need not suppose that in representing an event as directed toward an end we are representing the event as one in which that end is itself represented.

Nevertheless, we could *introduce* talk of representation at this point, and there is an intuitive sense in which the subjunctive background of organic activity is one in which ends are represented across that space of possibility. Here that talk is modelled by analogy with civic participation rather than perception, where *representation* is the relationship an elected official stands

to her constituency. Adopting this metaphor, we can say that a given end is more or less *represented* across a structure of OESSs according to the extent to which it appears in the consequent of these subjunctive conditionals. On this construal the representation of an end in an organic process is its showing in the subjunctive background, the space of possibility, characteristic of a species. We can thereby say that an organic process *represents* a given state as its end without supposing that in doing so we are thinking of that later state as something that is prospectively *guiding* the process in the way that minded activity represents a future state as that which is to be realized in the organization of the stages necessary to realize that end. All organisms will exhibit OESSs between their individual ends and their survival and reproduction, for instance; these are two ends that are represented across the subjunctive background of the organism *qua* organism (where ‘represented’ is taken in its democratic rather than referential sense, and where ‘*qua*’ signals an object-language expression of a material inferential rule).

Though minded activity and organic generation and growth share much the same structure, we need not suppose that in using the same language to characterize that structure we are everywhere and always employing the same conceptual resources (taking up the same commitments). In some cases attributions of purpose involve commitments concerning the representational features of those states and activities; in other cases such attribution is only a means for expressing commitment to structures across a subjunctive background of non-representational states and activities. To put the point in Brandomian terms, what we are *doing* in issuing judgments of purpose is giving object-language expression to this material inferential space, and what we are *saying* can be cashed out in terms respectable to the practice of science. For it should be clear that this view involves no spooky commitment to metaphysical entities uncountenanced by first-order inquiry in the various sciences. To say that an organism is a kind of thing with a pur-

positive form of life, one in which its various ends are represented as such by the activities characteristic of its species, is to do nothing more than express commitment to a complex context-sensitive set of inferences concerning how the members of a given kind would and would not behave in various contexts, and concerning the subjunctive background (the conditions of flourishing) of the species of which the animal is a member.

By the same token we can say that the life of an animal characteristic of its species is value-laden in the sense that there are things it ought and may do given what kind of organism it is. In this way we can domesticate talk of nature as a domain of values. The basis for attributing these ends and values is given by a story concerning the role that the possession of certain traits has played in the existence of members of a kind that bear those very traits (for this reason we can talk of fertilization of an egg as an end that is represented in the processes characteristic of the generation of sperm even though the vast majority of sperm will not see to the realization of that end in their particular cases).

#### 6.2.5 ON THE DECOMPOSITION OF ORGANIC PURPOSE AND VALUE TO STRUCTURED SUBJUNCTIVE RELATIONS

Once it is recognized that talk of purpose and value concerning organic generation and growth can be understood as expressing commitment to the structured subjunctive space within which organic activity is situated, one might propose to eliminate that talk in favor of language that makes no use of teleological and normative vocabulary. After all, if the role of these modalities can be explained in terms of subjunctive conditionals that do not employ that modal vocabulary, a proclivity for simplicity might counsel such a decomposition. There is a trade-off in simplicity

here, however. What one *gains* in simplicity concerning the kinds of vocabulary used in an explanation one *loses* in an increase in complexity concerning the number of sentences necessary to communicate the scope of that explanation. Though it employs language not found in a vocabulary restricted to ontic modal claims, an explanation like ‘the vine is climbing the tree so that it can reach the sunlight’ is far easier to process than are the sets of subjunctives that this teleological claim gives expression to. And in fact the recognition that teleological modality can be understood to express commitment to a structured subjunctive space can be used to disarm the worry that such language is problematic. For once it is recognized that talk of organic purpose is talk that gives expression to features of this subjunctive background then the use of that talk should be regarded as acceptable for anyone already employing subjunctive conditionals; all that is needed is that in addition one recognize that those subjunctives together exhibit a certain sort of structure. Nevertheless, while the decomposition of purposive language to a non-purposive subjunctive background can in principle be brought off in the sphere of the merely organic, I will argue at the end of the next chapter that once one recognizes the role that imperatives play in teleological contexts as we interact with persons it will become evident that to propose decomposing rational purpose and value into a corresponding subjunctive background is to be confused about the character of purpose and value as it pertains to rational beings.

## 7.0 HUMAN PERSONS ARE CREATURES OF RATIONAL SELF- DETERMINATION

*Everything that exists in as far as it is known and knowable is in interaction with other things....The catching up of human individuals into association is thus no new and unprecedented fact; it is a manifestation of a commonplace of existence....There is, again, nothing new or unprecedented in the fact that assemblage of things confers upon the assembly and its constituents new properties by means of unlocking energies hitherto pent in. The significant consideration is that assemblage of organic human beings transforms sequence and coexistence into participation.*

John Dewey, *Experience and Nature*

*We are stardust, we are golden, we are billion year old carbon  
And we've got to get ourselves back to the garden.*

Joni Mitchell, *Woodstock*

In this chapter I close out the metaphysical project begun in chapter 5 by arguing that our modes of reasoning and judgment about persons suffice to mark off a set of commitments concerning what it is to be a person. This will complete the application of the material inferential modal expressivism developed in the first half of the dissertation to the descriptive metaphysics of kinds investigated in the second half. As with the discussion of organisms I will in part be interested in elucidating the representational commitments we take up in reasoning about (and with) persons as we do. In the Introduction to chapter 5 I said there were two primary divisions in the modal

metaphysics under discussion in the second part of the dissertation: one concerning the contrast between chemicals on the one side and organisms and persons on the other, the latter two kinds falling under the normative and teleological modalities; the other concerning what differentiates the normative and teleological modal profiles of organisms and persons. At the end of chapter 5 I argued that the distinction between the ‘is’ of identity and the ‘is’ of constitution permitted us to see the world as composed of objects that, *qua* organic, fall under teleological and normative evaluation while also holding that those very same objects, *qua* the collections of stuffs that constitute them, can be understood in nonevaluative terms. In chapter 6 I provided an analysis of the subjunctive background of organic generation and growth, and I argued that this analysis was sufficient to explain the role of normative and purposive judgments of nature and thereby demarcate (our understanding of) the organic from (our understanding of) the chemical. In this chapter I will look at what specifically differentiates the normative and teleological modal profiles of organisms and persons.<sup>82</sup> Again I will proceed by paying attention to the representational commitments consequent on the use of different modalities and kind terms. Whereas attribution of purposive activity to the processes of organic generation and growth does not commit one to representing those processes as themselves representing their environment, in the cases where we impute intentional agency to an individual we do represent that individual as representing its environment. My contention in what follows is that persons are creatures that are represented as representing their ends *as ends*. I will defend this contention by showing that while the teleological modal profile of the rational activity characteristic of persons is analogous to that of the

---

<sup>82</sup> Though it will not be a focus of discussion, one difference is that the relationship between the social roles of human persons and the category ‘person’ is unlike the relationship between different species and the category ‘organism’. For a species of organism is a kind of organism, but a police officer or a mother is not a kind of person. My thanks to John McDowell for pressing me on this point.



modal profile of organic generation and growth there is a specific difference in that the rational agent represents her ends as rules that constrain her and to which she binds herself in self-government so as to see to the realization of those ends. I will then show that this difference is reflected in differences concerning the role of normative and teleological judgments made about persons as against their role in judgments of mere organisms. As a leitmotif I will argue that the structure and unity characteristic of human persons is analogous to that of organic species, but that each human person is capable of self-determination, and for this reason human persons appear as something like Thomist angels. I begin with a survey of Aquinas' view before outlining the chapter.

In Questions 50-64 of the First Part of the *Summa Theologica* Thomas Aquinas addresses the nature of angels and their existence. Because angels are spiritual substances, they satisfy a principle of specification. To be an angel is to be a substance with a wholly spiritual existence, as opposed to both inanimate objects like rocks which are wholly material substances, and mixed spiritual and material substances like human beings. But while angels are specified as spiritual substances, they cannot be *individuated* for, according to Aquinas' usage, individuation requires material existence and angels do not have material bodies. It is only with the spatio-temporal contingencies that matter brings with it that individuality is manifest for Aquinas. For this reason Aquinas concludes that each angel must be considered as a species unto itself.<sup>83</sup> It is not

---

<sup>83</sup> In "Has Mankind One Soul—An Angel Distributed Through Many Bodies?" G.E.M Anscombe (1985) considers an analogous situation concerning the relationship between imagination and cognition. The exercise of the imagination results in acts the contents of which are particular; your image of a car is numerically distinct from mine. But in cognition two different acts of the intellect may result in content that is common across them—when you and I both understand that  $2+2=4$  we understand the same thing. Anscombe says that if we suppose that the 'intellectual principle' in the soul is what differentiates human beings from animals then we would have to conclude that all human beings are one human being, for that principle results in the exercise of a faculty whose contents are common across different individuals. She thinks this absurd and so she dismisses the thought. But if the intellectual part of the soul is what differentiates human beings *as a species* from other species of animals, then as individual human beings we

clear what sort of identity speciation without individuality is or would involve, and to contemporary intellectual sensibilities it might seem the view is absurd. In what follows I will argue that, regardless of Aquinas's view about angels, there is a tolerably clear sense in which individual human beings exhibit a structure and unity characteristic of species, and this because of the fact that we *are* materially individuated by contingent features of our spatio-temporal existences.

The structure of the rest of the chapter is as follows. The sections in part 1 look at the subjunctive background of organic generation and growth discussed in chapter 6 in more detail. As before, talk of the values and ends of an individual *qua* organism will be understood as an object-language transposition of the material inferential rules that govern our understanding of organic individuals as members of different species. I will argue that in the organism-enabled subjunctive stabilities characteristic of purposive organic activity there are two dimensions of internal organic complexity that need to be considered, and I will give some examples to clarify how these two dimensions interact. The result will be a clearer view on the relationship between being 'onto' an individual *qua* organism, and being onto an individual as a member of a determinate species. In part 2 I will argue that an analogous relationship holds between being onto an individual as a human organism and being onto a human organism as a determinate individual personality. Crucially, however, whereas the values and ends constitutive of a species obtain for the members of that species independently of the activities of those members, the values and ends that make personal agency intelligible are at least sometimes in force for an individual only insofar as that individual has set those values and ends for herself as expressions of who she

---

may nevertheless be distinct from one another on account of the fact that we are each different animals. Though we may share an intellect, this, by itself, need be no more problematic than that we each share a genetic code manifested in slightly different ways in each of us. And that we might all be of one intellect and yet not realize it is no more mysterious than that at a certain age some one of us might have no recollection of the mental contents of the 5-year old he or she once was. But I wish to leave this aside.

takes herself to be. As this practice requires that persons not only represent certain states toward which she is directed, but also represent them *as ends*, I will argue that to be onto a person as a determinate individual is to represent that person as a thing that itself represents states and activities as value-laden. After giving this argument in **7.2.1** I will show in **7.2.2** that the practices surrounding the use of normative and teleological modality in judgments of personal activity, particularly as associated with imperatives, give expression to this peculiarly human form of life. This will put us in a position, in **7.2.3**, to see persons as analogous to Aquinas' angels insofar as the subjunctive background the grasp of which is a condition for being in cognitive truck with persons is like that of distinct organic species, but which background is unlike Aquinas' account of angels in that the subjunctive background for an individual person has the structure it does in virtue of the fact that the contingencies that accrue to us on account of our spatio-temporal existence are appropriated by us in laying out and living a rational plan for our lives that the angels, lacking material embodiment, cannot undertake. Though it was possible to conceive of the purposive and normative character of organic generation and growth in such a way that object-language talk of organisms contained no uses of either teleological or modal vocabulary, in **7.2.4** I will argue that the use of imperatives in teleological contexts is a practice that comes to constitute us in such a way that a similar move for persons involves making a decision that is not forced upon us by the nature of the issue.

## 7.1 ON THE STRUCTURE AND UNITY OF ORGANIC GENERATION AND GROWTH RECONSIDERED

### 7.1.1 THE IDENTITY AND INDIVIDUATION OF OBJECTS IN SPACE AND TIME

It has been a theme of this project that grasp of the various kinds under which an individual falls is a condition on grasping it as a determinate individual. Restricting ourselves to objects in space and time, to answer questions about a thing's kind one must be able to answer questions about how things of that kind behave in different contexts. And this means that the individuation of a spatio-temporal object is a practice that turns on the grasp of the subjunctive background of that object, the conditions under which it would and would not do various things. To put the point (only somewhat) metaphorically, the cognitive individuation of a singular object in space and time requires conceiving of that object against a background of merely possible spatio-temporal events—those that are consequent on what it is to be a member of some kind (the 'cognitive' qualification allows that we might regard individuation also as a practical capacity exhibited in one's dispositions to respond to an object in certain ways). Adopting a metaphysical rather than epistemic cast, spatio-temporal things are individuated as the things they are by the powers constitutive of their kinds.

Different kinds of objects exhibit more or less complexity in the subjunctive background that individuates them as what they are. The generation and growth of plants and animals exhibits ranges of subjunctively co-variant relations between the processes characteristic of a species and the resulting survival of individual members and perpetuation of the species that is not found among the merely organic. As it was put in the last chapter, the organism is a thing that appro-

priates and wards off the causal influences of its environment by making use of some of those forces as resources subjunctively directed toward the ends of its existence and staving off those that would threaten its ends. Through this activity the organism is homeostatically organized along hierarchies of feedback and self-regulation. Above all, this organization is oriented toward the survival of the individual and the perpetuation of its kind. But to say this is not to say that the organic process itself represents its future states as ends. For as we saw in the last chapter to say that there is *orientation toward a future state* need commit us to nothing more than a certain sort of subjunctive complexity in ordinary facts about organisms as electro-chemically and mechanically constituted given their genealogies. In this way explicitly teleological characterizations of the activities of the organism are domesticated as means of expressing commitment to the context-sensitive sets of inference this network of subjunctive conditionals is interpreted in terms of.

If grasp of the subjunctive background of an individual *qua* member of a kind is a condition on grasping that individual as a determinate thing, then this subjunctive interpretation of teleological modality permits us to understand the use of teleological vocabulary as a means of coordinating our understanding of the specific things an organism would and would not do in the context of the variety of forces that it interacts with in its environment. If grasp of any thing is conditioned by placing that thing in a subjunctive space, grasp of a purposive thing is conditioned by placing that thing in a structured subjunctive space concerning how the individual would and would not reorient its activities to realize the ends toward which those activities are directed.

This holds true of purposes that are mediated by intentional agency as it does for those mediated by organic generation and growth, and in both cases one uses teleological judgments to

mark points of orientation concerning how some thing would and would not behave in the face of various stimuli. One does not understand some particular exercise of agency as the exercise it is, as an instance of its kind, unless one knows something about how the agent would vary her behavior in the presence of potential defeaters. And so one does not understand what an agent is up to in some exercise of agency unless one knows how the agent would vary her behavior to see to it that the end of that exercise is realized. To understand a case of locomotion is a case of walking to the bank so that a check could be cashed, rather than one of walking to the library to reserve a particular book or simply as a case of walking for the exercise, one must know something about which route the agent will take, what she would do if a road ahead were under construction, how she would respond if the bank were closed, etc. To be onto what the agent is up to in a particular exercise of agency one often needs to know something about the background goals and values that motivate the agent to do what she does.

It is common that attributions of intentional agency, however, implicate attributions of prospectively-directed representational states to a thing. This is true of animal behavior as well as the agency of persons. The cheetah chasing its prey represents that prey in all sorts of detail. To be in cognitive step with animal behavior one must know something about the ends and values around which the animal's behaviors are subjunctively stable. And the knowledge we have of individual persons is mediated by a structure much like that which differentiates species under genera in the organic world, brought about by the fact that persons are creatures capable not only of representations of the objects at which their activities are directed, but of representations of the ends themselves as rules that guide behavior. Or so I will argue in part 2 of this chapter. As preparation I will examine the subjunctive background of organic activity in more detail.

### 7.1.2 ON THE STRUCTURE OF ORGANISM-ENABLED SUBJUNCTIVE STABILITIES

The key notion employed in chapter 6 was that of *organism-enabled subjunctively stable relations* among different organic and inorganic activities and states of affairs or events. Some of those relations held between the organism and its environment, some were internal to the organism in the interaction of its parts. In this chapter I want to focus on organism-enabled subjunctively stable connections between means and ends that are internal to individual organisms. I will sometimes speak of organism-enabled subjunctive stabilities and use the acronym ‘OESS’ as a shorthand (with the expectation that the reader will make grammatical changes as needed in context). It will be recalled that in an OESS connection between a means and an end the organism and/or some of its organic subsystems feature as both agents and patients (where questions concerning which particular events involve an organism as an agent or a patient are to be answered descriptively by way of the explanations we give). That is, an OESS is a process or state in which the organism is acting upon itself. Where  $\phi$ ,  $\psi$ , and  $E$  denote events and states in which the organism or some of its organic parts feature as both agents and patients the basic structure of an organism-enabled subjunctive stable connection between an internal means and an end is that of a relatively context-invariant connection between the means and the end (I am suppressing explicit reference to the organism in this representation):

$$\phi > \psi$$

corresponding to a *persistence* condition on the activities of the organism, and series of feedback cycles where the defeat (D) of the realization of an end is circumvented by the actualization of another organic process that enables (E) that connection:

$$\phi \& D > \sim \psi$$

$$\phi \& D > E$$

$$\phi \& D \& E > \psi^{84}$$

This latter structure corresponds to the *plasticity* of organic activity. The production of ATP, for instance, is strongly subjunctively connected to cellular construction, and various forces that would defeat cellular construction even in the presence of ATP production (e.g. insect attack or a microbial pathogen) are counteracted by other organic processes that ward off these intrusions into the processes of the organism. Different contexts underwrite and defeat different inferences, and so these subjunctives will vary in truth value according to the background conditions that hold in a given situation. A given OESS will include many conditions of defeat and enabling, but these four forms of subjunctive define its basic structure.

In addition it is convenient to note the more general ends that are realized by the presence of the satisfaction of a given means. While ATP production tends toward cellular development and the storing of energy, the production of ATP is also subjunctively correlated to more general ends of the organism like bodily integrity and the perpetuation of its kind. Though in general the realization of local organic ends affects the realization of all of its ends, some global ends are

---

<sup>84</sup> It will be recalled (cf. **6.2.2**) that on the interpretation of the subjunctive given in the first part of this dissertation the conditions that stand in the consequent of an OESS must be differentiated as separate events, e.g. by temporal indexing. Once again I suppress that additional detail for ease of notation.



more strongly correlated with the realization of certain local ends—e.g., failure to produce enough ATP for the production of a flower may undercut the organism’s tendency to perpetuate its kind, but this result will not tend to inhibit the organism’s individual survival. Adopting the convention that a given OESS’s relation to more global ends be included as a subjunctive conditional displayed in **bold** and whose ends are represented as consequents separated by semicolons, the resulting unit for an OESS is:

$$\varphi > \psi$$

$$\varphi \& D > \sim \psi$$

$$\varphi \& D > E$$

$$\varphi \& D \& E > \psi$$

...

...

$$\varphi > \chi; \mathbf{v; \dots survival; reproduction}$$

There is a second dimension to an OESS background. In addition to the vertical component specifying a given connection’s conditions for realization and defeat, there is the place of that connection in the economy of the organism as the member of some species. This second dimension can be displayed in horizontal relations between sets of OESSs at one grain of consideration and other processes that are structurally dependent upon the success of these prior connections, which dependence is reflected in transitive relations between subjunctive conditionals among different OESSs:

**Figure 1: The Two-Dimensional Structure of OESSs**

$\varphi > \psi$	$\psi > \rho$	...
$\varphi \& D > \sim \psi$	$\psi \& D_4 > \sim \rho$	...
$\varphi \& D > E$	$\psi \& D_4 > E_4$	
$\varphi \& D \& E > \psi$	$\psi \& D_4 \& E_4 > \rho$	
...	...	
$\varphi > \chi$	...	
$\varphi \& D_1 > \sim \chi$	<b><math>\psi &gt; a; c; \dots</math> survival; re-</b>	
$\varphi \& D_1 > E_1$	<b>production</b>	
$\varphi \& D_1 \& E_1 > \chi$		
...	...	
...	...	
<b><math>\varphi &gt; a; b; \dots</math> survival; re-</b>		
<b>production</b>		
...		
...		

The horizontal component of a structure of OESSs exhibits transitive relations between subjunctives, and many of these relations set up positive and negative feedback cycles. Were ATP produced the plant would fuel shoot apical meristem growth, were shoot apical meristem growth to occur the plant would capture more sunlight, and were the plant to capture more sunlight more ATP would be produced by the plant; thus, were ATP produced by the plant then more ATP would be produced by the plant (cf. the same relations expressed under ‘so that’). In general, however, we can consider the horizontal dimension of a structure of OESSs as one that moves from subsystems to more complex forms of unification as the graph moves from left to right. Of course these conditions can be defeated in many ways depending upon the kind of organism in question and its environment. This, too, will be represented in the OESS background of the species in question. But in general an organism is characterized by the part-whole unity and organization found in the subjunctively stable connections set up between its activities, its environ-

ment, and the flourishing peculiar to its species. In general each end will be supported by the subjunctive stabilities of a number of means—ATP production tends toward cellular growth, but only in a context in which water is retained for hydrolysis so that the energy stored in ATP molecules can be used. This feature of the subjunctive background of organic generation and growth is reflected in the fact that one OESS will have horizontal connections to a variety of other OESSs. Figures 2 and 3 discuss this structure in more detail:

**Figure 2: An Analysis of Figure 1**

$\varphi > \psi$ $\varphi \& D > \sim \psi$ $\varphi \& D > E$ $\varphi \& D \& E > \psi$ ...	$\psi > \rho$ $\psi \& D_4 > \sim \rho$ $\psi \& D_4 > E_4$ $\psi \& D_4 \& E_4 > \rho$ ...	...
$\varphi > \chi$ $\varphi \& D_1 > \sim \chi$ $\varphi \& D_1 > E_1$ $\varphi \& D_1 \& E_1 > \chi$ ... ... <b><math>\varphi &gt; a; b; \dots</math>survival; re-production</b> ... ...	... <b><math>\psi &gt; a; c; \dots</math>survival; re-production</b> ... ...	<b>[Horizontal Structure</b> marks relations between local means and the hierarchy of ends they make possible.] <b>Examples:</b> cellular construction at the shoot tends toward the growth of new leaves; growth of new leaves tends toward the collection of more sunlight, etc.

**[Vertical Structure** marks relations between a given means and the variety of the ends it tends toward

**Examples:** ATP production tends toward: cellular construction at the shoot apical meristem; the creation of chloroplasts; the creation of stomata, etc.]

**Figure 3: A Set of OESSs with More Detail**

$\varphi > \psi$	$\psi > \rho$	$\rho > \xi$
$\varphi \& D > \sim \psi$	$\psi \& D_4 > \sim \rho$	$\rho \& D_7 > \sim \xi$
$\varphi \& D > E$	$\psi \& D_4 > E_4$	$\rho \& D_7 > E_7$
$\varphi \& D \& E > \psi$	$\psi \& D_4 \& E_4 > \rho$	$\rho \& D_7 \& E_7 > \xi$
...	...	...
$\varphi > \chi$	$\psi > \pi$	<b><math>\rho &gt; a; c; \dots</math> survival; reproduction</b>
$\varphi \& D_1 > \sim \chi$	$\psi \& D_5 > \sim \pi$	...
$\varphi \& D_1 > E_1$	$\psi \& D_5 > E_5$	...
$\varphi \& D_1 \& E_1 > \chi$	$\psi \& D_5 \& E_5 > \pi$	...
...	...	...
$\varphi > v$	<b><math>\psi &gt; a; d; \dots</math> survival; reproduction</b>	...
$\varphi \& D_2 > \sim v$	...	...
$\varphi \& D_2 > E_2$	...	...
$\varphi \& D_2 \& E_2 > v$	...	...
...	...	...
...	...	...
<b><math>\varphi &gt; a; b; \dots</math> survival; reproduction</b>	...	...
...		
...		
$\tau > \sigma$	$\sigma > o$	
$\tau \& D_3 > \sim \sigma$	$\sigma \& D_6 > \sim o$	...
$\tau \& D_3 > E_3$	$\sigma \& D_6 > E_6$	...
$\tau \& D_3 \& E_3 > \sigma$	$\sigma \& D_6 \& E_6 > o$	...
...	...	...
...	...	...
<b><math>\tau &gt; c; d; \dots</math> survival; reproduction</b>	<b><math>\sigma &gt; b; d; \dots</math> survival; reproduction</b>	
...	...	
...	...	

It will be common to find homologous organs performing similar roles in different species, though the subjunctive space of an organ will vary from species to species. These variations represent different forms of life, ways of flourishing in the world that are peculiar to a species.<sup>85</sup> The processes that underlie visual organs are similar for a wide range of animals, and differences in the ways those processes play out in the life of the organism contribute to differences concerning what it is to be a member of a given species. Imposing a bit of structure on this picture, we can say that the processes of *differentiation* that mark off the subsystems of an organism from the subsystems of other organism only tell half the story. It is just as important that we have a sense of the way in which those differentiated processes are *unified* in the form of life characteristic of the species. That similar differentiations across different species can be unified according to different large-scale patterns is evident. Consider the case of ATP production in glycolysis, a form of cellular respiration common in many species (both plants and animals). The six-carbon sugar molecule glucose is generally stable, and so the formation of sugars by an organism allows the organism to store energy in that form. During glycolysis two ATP (adenosine triphosphate) molecules each donate a phosphate group to the sugar molecule, resulting in two ADP (adenosine diphosphate) and a fructose bi-phosphate molecule. Additional enzymes then split this fructose molecule into two three-carbon sugar molecules that are then broken down to produce four ATP molecules and two NADH molecules, resulting in a net gain of two ATP (and two NADH). As ATP is a major source of molecular energy, reservoirs of sugar are able to be converted to sources of energy by this process.

---

<sup>85</sup> I borrow this language from Thompson (2008).

This is a process that is common across many species, but different kinds of species accomplish this process in different ways. In terms of differentiation and unification, the production of ATP through glycolysis is a structure of *differentiation* that is common across many organisms but which is differently *unified* in various forms of life. While animals form ATP only in the mitochondria of their cells, many plants can also synthesize ATP through photosynthesis. Different environmental conditions support and inhibit this photosynthesis in different ways for different species, however, and here again similar processes of differentiation are unified in ways that can differ across species. Cacti and ferns both possess stomata, pores that open and close on the surface of a plant so as to regulate the inflow and outflow of water and CO<sub>2</sub>. This is a form of differentiation that distinguishes ATP production in plants and animals. Further differentiation concerning how stomata are used in a unified form of life supplies an additional level of detail. In a fern stomata close at night so that water is retained for hydrolysis in the breakdown of ATP, whereas stomata are open in the day so that CO<sub>2</sub> can be used (via a diffusion gradient) to fuel photosynthesis. But in a cactus open stomata during the day would lead to the release of excess water, and so stomata are closed during the day to retain water. CO<sub>2</sub> capturing instead occurs at night, and the stomata are opened then so that this can happen. That CO<sub>2</sub> is then converted with the enzyme PEP (phosphoenolpyruvate) carboxylase into a form that is stored so that it can be used to power photosynthesis during the day. Additionally, the energy found in ATP is appropriated for the construction of different cellular structures in different species. Cacti have barbs so that predators will be deterred from eating them, for in the water-scarce environments in which cacti grow they will be sources of hydration for animals. But ferns do not thrive in water-scarce environments and so they do not need to produce such structures. And in animals ATP

(which can only be synthesized by mitochondria, as we lack photosynthetic capacities) is used in nervous system signaling and development.

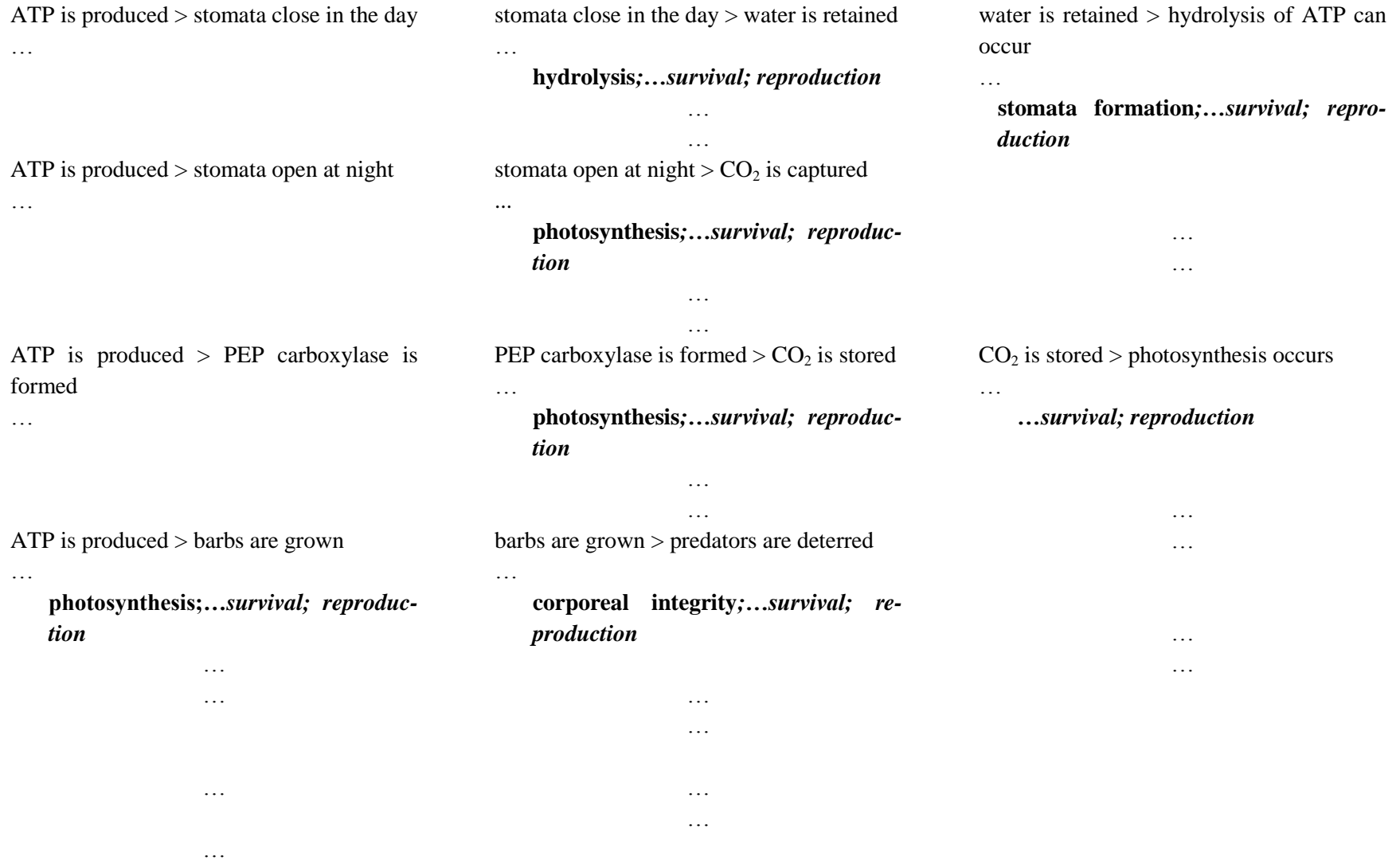
For another case where similar processes of differentiation are unified according to specific forms of life consider the development of musculature fit for running and eyes for sharp vision in gazelle and in cheetah. The production and use of opsins (proteins for vision) represent vision as an end of these processes in both gazelle and cheetah, though that end is integrated with the rest of the activity characteristic of the two species in different ways. While the eyes of the cheetah and the gazelle are both directed toward sharp vision and tracking movement, the placement of the eyes on the side of the head affords the gazelle better chance to see predators, whereas the placement of the cheetah's eyes on the front of its head enable it to better gauge distance in chasing its prey. And though the biochemical processes of muscular development are largely the same in both animals, the muscles produced and the interaction between such things as muscular response and adrenaline production contribute to different tendencies (flight or fight responses) among the members of the species. Again common structures of *differentiation* in the lives of different species are *unified* in ways that are peculiar to a particular species: gazelle adrenaline supports long bouts of running, but a cheetah can only sustain its speed for short bursts. To have a grip on the subjunctive background of an individual organism one must know something about *both* its individual traits *and* how those traits are unified in its specific form of life.

### 7.1.3 SPECIES AND GENERA

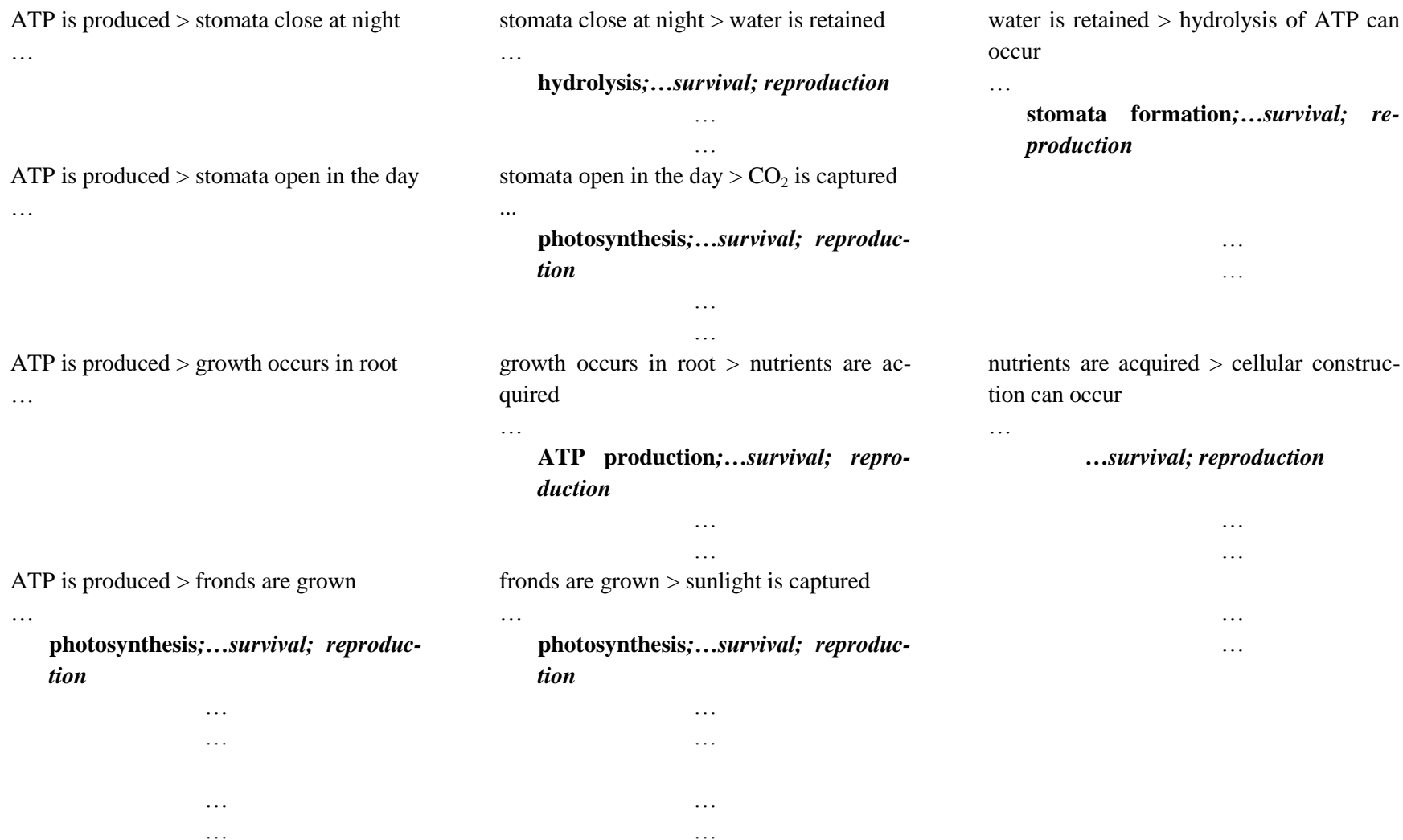
It may help to look at the contrast between part of the subjunctive backgrounds of ATP production in cacti and in ferns in more detail. If we suppress some of the structure of these OESSs and denote the ends of a given means in **bold** without worrying about denoting the subjunctive conditionals in question a partial representation of the OESS structures of a cactus and a fern can be represented by Figures **4** and **5**.



**Figure 4: Partial OESS Structure of a Cactus**



**Figure 5: Partial OESS Structure of a Fern**



Not only are there differences in the differentiation of these two forms of organism (as exhibited by the fact that only the cactus tends toward the production of PEP carboxylase as a means of storing CO<sub>2</sub>) but also in their unifications (as exhibited by the fact that even though both species tend toward the production of stomata these cells are used by the organisms in different ways). A similar consideration of the subjunctive background characteristic of the production of sharp vision and musculature in cheetah and gazelle, as unified according to, e.g., eye placement and integration with adrenaline production, would show a corresponding difference in the subjunctive backgrounds of these species.

It will be recalled (6.2.4) that talk of the *representation* of a trait as an end in the life of the organism can be understood on analogy with voting rather than perception. On this approach, to say that a state or activity is represented as an end by an organic process is to say that the end is well-represented as a condition on its survival and reproduction across the space of possibility, the subjunctive background, against which the organism is individuated as the kind of thing it is. The representation of a given end across a variety of OESSs indicates that the end in question is one that gives a point of orientation concerning the large-scale activities characteristic of the species, and this helps to explain why the grasp of such ends is a condition for understanding an organism as an individual thing. The fact that adrenaline production is reliably covariant with a range of activities typical for the species, or that a flowering plant will expend so much of its energy in the creation of its flowers, are facts the possession of which, exhibited in one's facility with the subjunctive background of the members of the species, enables one to be 'on to' the members of those species.

We can make general and specific remarks about the representation of different ends across the subjunctive background of an organism. What it is to be on to an organism *qua* organ-

ism is to reason about it in forms of this sort; but what it is to be on to a *specific* organism is to integrate its various traits, many of which will be common across many species, in a way that is peculiar to its species. One understands what it is to flourish as a kind only to the extent that one has facility with these specific subjunctive structures, whether at the level of species (e.g. cactus and fern, cheetah and gazelle) or more general forms of life (e.g. predator and prey, plant and animal). Though the general category ‘organism’ is one that has this sort of structure, picking out an individual as a particular kind of organism is a practice that requires placing its activities in the context of a subjunctive framework that plots tendencies regarding how the individual would and would not vary its behavior in different contexts. You are not ‘onto’ a plant or an animal, or a cheetah or an gazelle, unless you can make these *specific* forms of inference.

## 7.2 ON THE STRUCTURE AND UNITY OF HUMAN PERSONS

### 7.2.1 PERSONAL AGENCY AS THE REPRESENTATION OF RULES

To say that an end is represented in a set of organic processes, or that a set of organic processes represents some state or activity as an end, is not to lay an additional claim of fact alongside the physical processes constituting organic activity and the general picture of the organism as a thing whose species’ history explains the traits it possesses. Instead the use of such language expresses commitment to a certain sort of structure in the subjunctive background of its activities. Still less is the attribution of purposes to an organism to represent it as thing that is representing *to itself* those ends as guides for action. This can be so even if we habitually use volitional and sen-

sory/cognitive propositional attitude ascription when describing the purposive activity of an organic thing—the vine is *looking* for something rigid to *climb*, the plant is *trying* to find the sunlight. We do not suppose these processes are prospectively directed toward their ends on account of there being some representational system that is picturing those ends.

Representation in its perceptual guise is implicated by the attribution of intentional agency. And here we do suppose that such behavior is mediated by representations of future states. In the case of a cheetah chasing its prey, to see the cheetah as engaged in chase is to see it as a thing that is representing its quarry as, for example, about to run to the left. In our doing so we see the animal as a thing that is capable of representing its ends. Nevertheless, we need not suppose that the representations in play include representations of its ends *as ends*. We can say that states of the cheetah's central nervous system represent (or contribute to a representation of) the animal it is chasing, and the cheetah's form of life is such that we can say that the capturing of prey is represented as an end of its activity given its subjunctive background—but we can keep these two sorts of attributions of end-directedness distinct and so need not suppose that in representing its prey the cheetah represents that prey *as to be captured*. It is not as if in the cheetah's representation of the prey *as to be caught* (a representation it pulls off in virtue of its representing the prey as moving in such and such a direction, with its legs pivoted at time *t* in such a way that it will shortly break to the left) there is some further element that is the representation of it as an end, like another leg or a longer tail. Rather, for the cheetah to represent the prey as to be caught is to *treat* that animal in a certain way, to respond to it in ways that situate its place in the cheetah's life. There may be nothing in an animal's cognitive economy that constitutes a representation of an end *as* an end, even though as a creature capable of cognitively mediated activity it represents various features of its environment so as to coordinate itself in relation to them. The

old metaphor of organic process as the process of an artificer that frames a view of the end and then prospectively guides organic activity so as to see to it that the parts of the organism realize that end is simply a metaphor—useful for picking out the structure characteristic of organic purpose by analogy with the structure characteristic of agency, but beyond that there is no need to attribute the intentionality characteristic of agency to the processes of organic generation and growth. And in our representing an animal as an agent we need not suppose that to represent an animal's activity as directed toward an end that is mediated by its own representations of that end is to represent that activity as one in which the animal itself represents the end as an end.

With the capacity for rational activity, however, it becomes possible to not only represent the world but to represent it as a domain of possible ends. For rational activity is a function of rational deliberation, and rational deliberation is a process of weighing various ends as ends, assessing them not merely as means to ends that are supplied by nature but instead to query the value of those ends themselves. It is true that in the more complex forms of animal life we have shades of personality—affective and volitional traits that make it reasonable to regard a given animal as fearful, friendly, temperamental, etc. And when asked why an animal behaved in some way it is often in order to respond by talking about what they knew or believed, and about the reasons they have. But persons are capable of recognizing and binding themselves to commitments that are not simply given to them in virtue of their being the organisms they are. And so explanations for the behaviors of persons often proceed by way of appeal to these commitments. In doing so we attribute representations to an individual not only of the future states its activity is directed toward. We also attribute representations of the *propriety* of their own behavior as something that the agent, *qua* rational, is at least implicitly committed to in what she does, even though she may never have given that propriety any conscious consideration.

This feature of the life of human persons as rational animals is reflected in our ability to cultivate and exercise skills of various sorts. As I am using the term here a *skill* is a capacity to carry out an extended piece of practical activity by unifying separate pieces of end-directed behavior in the pursuit of an end the realization of which is not part of the individual's inborn capacities, and which is a capacity acquired by effort both socially on the part of the training-regimens that impart skills to new members of the community and individually on the part of the exercise of those skills as conditions on their acquisition. One does not acquire a skill save insofar as one receives training and engages in the practice of the skill (modulo questions about the origin of tool-construction, an anthropological question the details of which need not concern us here). Everything from flint-knapping to aero-space engineering to the practice of law or art will count as skills on this construal. Collections of skills will define different social roles, and those roles can be roughly grouped according to the sort of livelihood they afford: *trades* like carpentry, machine work, and auto repair; *professions* like engineering, law, education and medicine; etc.

Though the cultivation of a skill involves appropriating inborn organic capacities, those capacities are put to new uses. The musician employs her vision and motor control in the use of her instrument, and this enables her to engage in activities that are not possible with the untrained exercise of those dispositions. By appropriating these organic traits for the cultivation of a skillset, human persons come to acquire a level of differentiation beyond that which is definitive of the species. Just as the traits that differentiate and unify different species of organism exhibit similar structures put to use in vary degrees of similarity across species, so will individual skills occur and be put to use in particular ways by different trades and professions. Mathemati-

cal training is necessary for many careers, but the specific branches of math and the uses to which they are put vary widely across society.

The development of additional forms of differentiation and unification does not of itself mark a difference in kind from the capacities of the merely organic; after all, the higher organisms have forms of life that are more complex than the lower (as exhibited in, e.g., the structures that ATP is used to build), but they are all of a kind. But the development of skillful differentiation, as mediated by rationality, grounds a form of life that *is* different in kind from nonrational organic activity. For the exercise of a skill is an activity that requires forethought and planning both in the individual exercises of that skill (one habitually responds irascibly or with equipoise, but designing a bridge, writing a sonnet, or solving a logical problem takes protracted and reflective effort) and in the process of determining what sort of skillset one will develop (one does not learn to practice law the way a foal learns to walk upon birth). To engage in this form of extended rational activity we must not only represent some end, but we must represent it *as an end*, as a rule or guide for action around which we subordinate the rest of what we do so as to see that the end is realized. And that process is one in which we set ends for ourselves that come to define us as the individual people we are by giving expression to the values that motivate what we do. Again, this is not to deny that the contingent features of individual organisms often equip them with shades of personality (think of the way we personify our pets). But the human person is that which, in addition to these biological and environmental contingencies, takes up and binds itself to commitments that are self-selected. This is not to say that these contingent features of our lives are part of our personal identity in the sense in which philosophers are interested in what it takes for a thing to be one and the same *individual* person. Rather, the point is that variations in the way these contingencies are organized in the lives of individual persons make for dif-



ferences in character, in the *kinds* of persons we take ourselves to be. I would still be the same individual I am had I not decided to study philosophy, but given the opportunities it has afforded me that decision has shaped my character, the kind of person I am, and I would not be the kind of person I am (in some ways) had I not made that decision.<sup>86</sup> The identity characteristic of a person, as a principle of individuation that is more than what is found in the merely organic, is manifest in the values and ends we express in the skills we come to possess and exercise as we take advantage of the opportunities afforded our contingent place in space and time.

We do not undertake this activity alone. The acquisition of a skillset is a cultural process, one that proceeds by taking on board not only a set of sensory-motor habits not found in us by nature, but also a set of cultural values that come to motivate our employment of those habits. Through this process of acculturation there is, in all but the most tyrannous of social conditions, the possibility for self-determination within that set of values. And this makes it possible to subordinate our biological ends to a set of rational ends, values and purposes we take to be more important than those that are given to us by pre-reflective inclination. In particular, our values and ends can motive us to act in ways that subordinate individual survival and reproduction of the species to something we hold to be more important. This gives human persons a form of life, a determinate notion that unifies the differentiations characteristic of our species, that subordinates the form of life characteristic of the species: considered *qua* human being the decision to self-immolate may be unintelligible, but as an act of political protest that decision expresses a settled conviction concerning the values definitive of the person's identity. This subordination of organic inclination to rational self-deliberation is exhibited in the sorts of explanations we give for

---

<sup>86</sup> Because I am not addressing questions of personal identity in this guise, I hope the present account can be neutral regarding the various theories of personal identity that have been proposed—e.g., axiological or deontological theories of persons.

what a person is doing—even though some activity may be disadvantageous to the individual and its kind (e.g. being a desert hermit), we advert to the personal values embodied in that activity as a way of making sense of why the person is doing what they do.<sup>87</sup> It is because he's the sort of person who values the scenery that he took the long way home. The exercise of rationality underwrites explanations for what a person is doing in terms of the values that motivate them and the ends they wish to realize.

More generally, in the cultivation of a skillset a person manifests a form of self-determination, a form of life that is of a *rational plan*, that goes beyond the form of life given to them by their species. And this plan acts as a guide for unifying (both in our understanding of the person and in the person's activity) the individual actions a person takes to realize that plan. Here there is the prospective intentional purpose characteristic of agency, modified by the capacity to represent ends as guides for action whose binding force on the agent is mediated by cognition of the propriety of the end as a rule rather than by the push-and-pull of affective sensory/motor response. Though the cheetah and the police officer each represent a quarry as *to be caught*, the police officer's representation of that end includes (or at least upon reflection *can* include) a representation of the propriety of that end given such things as the social conditions of order and the oath she has taken as an officer of the law. In the exercise of self-control, sublimating our inclinations in the service of ends we take to be more valuable, human persons come to define themselves according to those ends. The person is a creature that defines itself according to a set of values and ends not given to it by its natural conditions of existence.

---

<sup>87</sup> That is why evolutionary explanations for what a person does in terms of reproductive fitness are so emasculating—because they efface the reasons and values characteristic of the person in favor of an explanation that goes no further than their species-kind, these explanations efface the *person*.

This is a form of unification, made available by the differentiation of a socially conditioned and individually tailored skillset, that is not possible for organisms. Lacking the capacity for rational self-reflection and the pursuit of a life-structuring plan of action that socialization affords, mere organisms lack the purposive unity characteristic of persons. But this means to understand what an individual person is doing, in the sense of ‘what they are up to’ as a rational creature over the course of their lives, one must be able to integrate their activity *qua* individual with a particular skillset and set of values/ends that define them. One does not understand what the person is up to unless she can reason in ways that track these values and ends, and the activities the agent undertakes to realize them. Just so, one does not understand what it is for an individual person to flourish as that individual unless one understands them according to their peculiar capacities and values.

The self-identity of the person, in the sense of self the grasp of which is necessary for understanding what a person is generally up to in their lives, is in part exhibited in the will of the person in its various practices—that is, in the trade-offs the person makes in seeing to it that a particular plan of life is realized.<sup>88</sup> These social practices have much the same subjunctive structure as organic generation and growth. For just as the role of a species-concept is to furnish an understanding of an individual organism’s activities by specifying the subjunctive conditionals that articulate the powers characteristic of that species, the idea we have of the identity of an individual person is an idea that is exhibited in the values and ends that unify the traits they have developed over the course of their lives. But this means that *individual* persons exhibit a structure and unity characteristic of organic *species*: the human person is to its species as the species is to its genera—a determination of a more general form (for my purposes I think I can be neutral

---

<sup>88</sup> This is not to deny that social conditions, innate talent, biological traits, opportunity, etc. are part of the calculus as well.

on whether this should be thought of as a determination-of-a-determinable relation or as a species-of-a-genus relation).

### 7.2.2 THE GROUND OF THIS VIEW IN PRACTICES OF REASONING

So far in this chapter I have engaged in a constructive project relating the structure and unity characteristic of human persons to that characteristic of organic species and their genera. If this feature of persons as social creatures of rational self-determination is one that we are committed to simply in virtue of how we reason about persons, it should be reflected in the forms of judgment and inference we make about them. In this section I will argue that this metaphysical division shows up in differences concerning our how we reason about persons as against organisms, differences that are exhibited both in our uses of normativity modalities and in the retrospective and prospective dimensions of our reasoning under teleological modalities.

First, it is characteristic of the exercise of agency that we endorse a principle on which ‘ought’ implies ‘can’—not that this principle is everywhere and always accepted, but that it is generally obeyed. To discover that an agent could not, through no fault of her own, accomplish some putative end often mitigates our judgment that the agent is defective or to be censured in not meeting it. By contrast it is no bar to our judgments of defect that an organism was incapable of producing some trait emblematic of its kind—the cactus that cannot grow barbs or the hawk with poor vision is no less defective for the fact that the impossibility is one that the organism had no chance of avoiding. Second, when explaining why a given person has some end or value as part of her life it we typically refer to the decisions she has made in setting up her life as she sees fit. By contrast, we explain the presence of an end characteristic of an organism only with regard to the causal etiology of its traits as they have tended toward the propagation of members

of the species bearing those traits. That the stomata on a cactus ought to be closed in the day is something that is explained by the role that water retention plays and has played in the life of the species. But that some architect ought to finish a drawing on time, or ought to be familiar with the latest drawing program, is explained (at least in part) by the decisions that architect has made in choosing that career path. This difference in the sorts of explanations we give concerning the origin of the powers of an organism and a person corresponds to a difference in our conception about what it is to be one of these kinds: while a fern or gazelle has no control over what counts as the flourishing peculiar to it as the individual organism it is, a person is a creature whose flourishing is (at least in part, and in all but the most tyrannical social conditions) subject to self-determination. Both of these features of the lives of persons—the principle that ‘ought’ implies ‘can’ and the role of individual choice in explaining why a given set of ends and values appertains to an individual—can be understood as expressions of the fact that we take persons to be creatures of rational self-determination, agents whose activities are directed toward a sense of self that is not given to them by their merely organic existence. Whereas the value-laden capacities had by the members of a species are had by them in virtue of their ancestry, the human person is able to cultivate new forms of value-laden activity. In the retrospective account we give of the origins of the powers characteristic of an individual organism we look to that organism’s ancestry; in the retrospective account we give of the origins of the powers characteristic of an individual person we must look to the will of the individual as a source of self-determination and value.<sup>89</sup>

If human persons can be reasonably treated as creatures that engage in socially mediated rational self-control—if this conception of ourselves is one that is grounded in the very idea of a

---

<sup>89</sup> This is not to deny that society conditions human persons in all sorts of ways.

human person as a thing to be individuated in nature—then one would expect to see that imperatives would play some important role in mediating this view of ourselves. And on the side of the prospective dimension of teleological reasoning about persons and organisms we see a difference not so much in how we reason *about* them as in how we reason *with* them by issuing rational commands. Or rather, the fact *that* we reason *with* persons, treating them as sensitive to the force of reason, is a feature of our use of teleological modality that differentiates our understanding of persons from that of organisms. This aspect of persons as self-governing creatures finds expression in what I call ‘teleological imperatives’. It is a feature of two-place teleological operators that imperatives can be embedded in their first position and the second position filled by an end toward which the command is directed (e.g. ‘shut the door so that the child does not catch a cold’). These teleological imperatives call upon the auditors to engage their rational faculties in potentially reorienting their activities in ways that the command by itself would leave undecided. For instance, at a context the bare imperative ‘shut the door’ will not communicate to an auditor that the window should be shut as well. But by saying ‘shut the door so that the child does not catch a cold’ the speaker enables an auditor to take additional steps to see to it that the purpose that motivates the command is realized, and this even though the speaker may not be aware of these other requirements. These teleological imperatives enable groups of people to coordinate activity around shared purposes by each contributing her own knowledge toward projects that no one may have the knowledge needed to accomplish on his or her own. And by the use of these reason-guiding commands the ends of an activity can themselves be raised for critical discussion. In both cases the social aspect of this process draws on the rationality of the members of the community, of those engaged in the issuing, discussion, and action on these imperatives (the voting procedures of fraternal organizations typify this sort of procedure). Use of such teleological

imperatives thereby gives expression to our commitment to view an auditor as a source of rational activity, a thing that acts not merely in conformity with a rule but from a representation of a rule as that which prescribes one's behavior.

It would be a mistake to view the teleological imperative as a merely causal device for controlling others' behavior. While the use of imperatives may in many cases be characterized as a process of causal conditioning whereby the habits of an auditor are shaped by fear-induced response to the command, it is a feature of a *teleological* imperative that they induce responses based on the exercise of the auditor's rational faculties. Even if to issue an imperative is to causally shape the habits of another, to issue a teleological imperative is to regard the other as a rule-following thing, something capable of acting not merely in conformity with a rule but in recognition of its bindingness as a rule. In the use of teleological imperatives we are in practice treating our auditors as persons, as creatures capable of representing not only an end but of representing the *proprieties* of the actions an end implicates. And this is to say that in the use of teleological imperatives we give expression to our representation of a thing as a person, a self-determining creature of rational will.

Our modes of judgment and reasoning about persons are such that we are committed to seeing ourselves as creatures whose capacity to self-consciously govern ourselves according to rules that rationally prescribe our conduct marks us off as distinct from every other kind of thing. By the use of these self- and other-directed teleological imperatives we shape our habits into the skillsets that afford us our individual identities as the persons we are.<sup>90</sup> In human persons our organic diversification makes possible the cultivation of *skill*, and in unification these skills, exhibited in the careers and hobbies that particular persons pursue, give expression to sets of ends

---

<sup>90</sup> For related ideas about the role of self-directed imperatives in the identity and individuation of persons see Peirce (1905b) pp.290-1, (1906) pp.278 and 284, and Sellars (1974) p.86.

and values that are not given to us by our organic existence. To see something as a person is to integrate its activity around the reasons it has for doing what it does, and toward the ends its activities are directed—persons are understood in terms of the skillful employment of their capacities, and skillful employment is understood in terms of the purposive subjunctive structure of agency. Each person’s skills are unified according to a set of values and ends that are, in principle, subject to socially conditioned individual self-determination. These values and ends are represented by us as rules to which we bind ourselves in recognition of their propriety—the human person is a creature that makes its will into a law of nature, and we flourish as human persons to the extent that we do so.<sup>91</sup>

### 7.2.3 RETURNING TO AQUINAS

Aquinas held that each of the angels was something like a species unto itself. But whereas for Aquinas this feature of the structure and unity of angels was consequent on their lacking material embodiment, for human persons it is precisely because we are material creatures capable of cultivating powers that are not given to us by our species that we are each of us something like a species unto ourselves. The contingencies that naturally accrue to an individual that has spatio-temporal constitution are that which ensures its individuality under a species, and without having those contingencies Thomist angels are each like a species unto themselves. But the spatio-temporal (and especially socio-historical) contingencies that accrue to individual humans is pre-

---

<sup>91</sup> The influence of Books I and II of Aristotle’s *Nicomachean Ethics* should be evident at this point. It might be worried that this view entails that developmentally disabled human persons are not *persons*. But this worry is misguided. What follows only is that the developmentally disabled may not flourish in the way normal human persons do, just as a withering cactus is not flourishing *qua* cactus. As unpleasant as it may be at times to give voice to such facts, they remain facts about us *qua* the organisms we are.



cisely that which, through our will in rational self-determination, afford us each an individual structure and unity that is analogous to the determination of a species under a genus.

In fact, in some ways Aquinas' angels end up looking more like nonrational animals. For the will of nonrational animals, on Aquinas' view, is moved by sentient appetites that are given to them by their species, just as are the angels moved by their species-ends. Nonrational animals cannot will any good not given by their species because the good for a nonrational animal *just is* what is given by its species. Lacking the capacity for rational deliberation and self-determination, they lack the power to will anything not given by their species. While it is true that angels have intellect, and so a capacity for rational action that nonrational animals do not possess, the angels lack the appetitive soul. And for this reason they do not have the opportunity to seek out and rationally satisfy any of the particular wants and desires that come with the power of appetite (cf. *Summa* 1:59). Not having an appetitive soul they, like nonrational animals, also cannot will anything not given by their species. They lack this opportunity not because they lack the *power of rational intellect* necessary for its exercise, but because they lack the *matter* through which that power is actualized.

Human persons, on the other hand, have *both* a sensuous appetite and an intellect, and for this reason our will can be directed at a good that is not given by our species; we can engage in self-determination in the pursuit of those ends that motivate us in our contingent places in space and time. Thus, even though Aquinas may be right that the will of the angels is free, our freedom is *greater in scope* for we have a capacity to determine ends (and so goods that are consequent on those ends) that are not fixed by our species. And in this we can make out a sense in which the gnostic view of the events surrounding Adam and Eve's eating from the Tree of Knowledge is more apt than the orthodox view, for the gnostics thought the angels envied hu-

manity the fall into matter in that it meant that we had a chance to exercise our will in a way that could result, depending upon the practitioner's activity, in a state that is more blessed than the purely spiritual existence of the angels.

#### 7.2.4 ON THE NATURE OF RATIONAL WILL AND VALUATION

Though we are committed to seeing the relationship between organisms and the parts that compose them as one of constitution rather than identity, as evidenced in the fact that we believe that the dog would be the same individual were it to have a haircut though it would not be the same collection of stuff, it would be difficult to suppose that the relationship between human persons and human organisms was anything other than identity (cf. the discussion at **5.2.6** on the distinction between the 'is' of identity and the 'is' of constitution). Unless one is willing to go in for some sort of mind/body dualism the person I am could not have been anything other than the human being I am—no matter how similar another personality may be to my own, as a person I could not be any organism other than the one I find myself to be.<sup>92</sup> Our commitment to the identity between ourselves and the organisms we are is expressed in our making such claims as "I am hungry" and "I have been cut" rather than "my body is hungry" or "my body has been cut." If that is right then as human persons we inherit the values and ends that we have as human beings. And this inheritance is a source of consternation for there are times when we find ourselves *qua* persons at odds with ourselves *qua* organisms. But unlike the ontic modalities, for which 'necessarily  $\phi$ ' and 'necessarily  $\sim\phi$ ' are incompatible for any coherent  $\phi$ , it can happen that one and the same fact both ought to be and ought not to be—e.g., *qua* police officer he ought to arrest the

---

<sup>92</sup> This allows that we are properly identical only with a part of our organic bodies, of course—as perhaps we are central nervous systems.

shoplifter but *qua* brother he ought not. These features of normative modality and the relationship between human persons and human organisms means that the lives of human persons can be sources of tragedy.

One might hope to avoid this conclusion by decomposing the rational purposes and values of human persons into complexes of subjunctive conditionals that themselves do not make use of teleological and normative vocabulary, analogous to the way I suggested that decomposition could be brought off in the domain of organic generation and growth in 6.2.5. To do so is to make a decision, however, and it is one that is not forced on us. To treat a rational creature as merely subject to causal explanation is to refuse to accord them the recognition as a locus of value and purpose. While this always remains an option in trying to understand what some person does, to take this option at every turn is to refuse to countenance persons within one's worldview. This is reflected in the fact that in reasoning about persons we are able to reason *with* them, and we have seen that teleological imperatives, commands issued with a reference to the end as a point of orientation, give expression to this fact about persons as objects the recognition of which as rational is a condition on understanding them as persons. More to the point, this proposal is confused about what it is to understand ourselves as persons—that understanding is something we *do* and is not merely one we are passively responsive to in thinking about a world distinct from us. It is as if one could determine whether someone was a personal friend by merely observing her and never treating her in turn as a friend. The question of whether someone is a friend is a question concerning a *decision*, of *choosing* to *take* that person as a friend. Sure enough, one may even then be misled in the taking. But one who refuses to make that decision cannot treat the sentence 'I have no friends' as if it were some sort of discovery on a par with

finding water on Mars.<sup>93</sup> Similarly, the role of rational will in instituting and binding ourselves to the rules that define us is such that our very activity *makes it the case* that we are creatures whose doings are to be understood in terms of the values and ends that motivate us (not in every case, of course). For this reason the decomposition of purpose and value to the merely chemical activity of nature is not of a piece with that decomposition as it can occur in judgments about the merely organic. As a matter of fact, given the kinds of evolved and educated things we are, it is through the use of imperatives in teleological contexts that we have made and will continue to make ourselves into creatures of rational self-determination. Perhaps it could have been otherwise for different sorts of persons, but human persons are creatures whose nature and history is such as to (generally) make them into rational beings. If that is right, then the rational will as the source of self-government is the sort of thing that plays an ineliminable role in understanding what it is that human persons are up to (at least in some cases). Because the will is a capacity whose exercise in rational animals is (at least sometimes) directed by self-governed value, and because the possibilities toward which human persons can direct their wills is conditioned by a long process in both the ontogeny of the individual and in the development of her culture, this means that the rational will of human beings both is a ground of and is grounded in its cultural context. Without the exercise of rational will there would not be the determinate forms of cultural identity we find in the world, and without those cultures (and the practices of education or *Bildung* that sustain them) individual persons would not have the capacity to determine themselves in the ways they do. It goes beyond the current project to defend this claim in the detail it deserves but its roots in the Romantic and Enlightenment thought of 18<sup>th</sup> and 19<sup>th</sup> century Europe

---

<sup>93</sup> As I read him, this is a claim James makes about religious belief in “The Will to Believe”, arguing as he does that belief in God is more like an opportunity to cultivate a relationship rather than a discovery one makes about an impersonal world.

and America should be evident, and I take it as a virtue of this account that it can be seen as growing out of those roots.<sup>94</sup>

I framed this discussion with a look at Aquinas' position on angels as species unto themselves and I argued that human persons have a structure and unity analogous to that of Thomist angels. I have just argued that both the existence and determinate character of human persons is in part grounded in, to be explained by and understood through, the will as a source of self-government. I want to close by juxtaposing this last point with one that appears in the second chapter of the *Brihadaranyaka Upanishad* (c.9<sup>th</sup>-6th century BCE). In the famous 'honey' theory the author uses a play on the Sanskrit word for honey, '*madhu*', a term that in this context also connotes effect or consequence. In what would become a defining characteristic of the Vedanta school of Hinduism this chapter lays out a series of claims that different features of the world are both effects and causes of individuals, much as the honey in a bee colony is both the effect and sustenance of the bees. Each verse has the same structure, claiming that some primeval aspect of nature is at once a consequence of all beings, a source of all beings, and a component of the bodies of all beings. The section begins (Müller 1884, p.113)

This earth is the honey (*madhu*, the effect) of all beings, and all beings are the honey (*madhu*, the effect) of this earth. Likewise this bright, immortal person in this earth, and that bright immortal person incorporated in the body (both are *madhu*). He indeed is the same as that Self, that Immortal, that Brahman, that All.

---

<sup>94</sup> Further remarks along these lines can be found in my (2014), (Forthcoming a), and (Forthcoming b).

The author goes on to say that water as the honey/effect of all beings exists as seeds in the body, that fire exists as speech, that air exists as breath, the sun as the eye, space as the ear, the moon as the mind, etc. Metaphorical though it may be to consider space and the sun to be the *madhu* of human beings, we are at a point now where we can say that human persons are the *madhu* of rational value and that rational value is the *madhu* of human persons.

## 8.0 CONCLUSION AND NOTES FOR FURTHER WORK

*Enough—I bring such to a close,  
Rise ecstatic through all, sweep with the true gravitation,  
The whirling and whirling elemental within me.*

Walt Whitman, *Leaves of Grass*

In section **1.1.8** of the Introduction I said that the dissertation as a whole was an instance of the form of reasoning that Peirce came to view as the structure of inquiry. In his mature view Peirce thought that inquiry begins with an abductive inference, a supposition that aims to extend our understanding of some domain into a new region. One then draws deductive consequences from that supposition—inferences concerning what would follow if the supposition were true. Finally one investigates to see whether those consequences obtain, and if they do one takes an induction over the cases to the conclusion (perhaps probabilistically weighted) that the initial supposition is true. The abductive supposition that began this project was that a material inferential modal expressivism as outlined in the Introduction and developed in the first part of the dissertation could be used to underwrite a descriptive modal metaphysics. It followed from this supposition that, if it were true, various of our representational commitments concerning chemicals, organisms, and persons could be understood in terms of that expressivism. Throughout the second part of the dissertation I have argued that some of our most primitive kind-specific representational commitments could indeed be understood on the basis of the material inferential modal expressivism developed in the first part. This abductive and deductive process was also

employed throughout the dissertation itself: if the material inferential interpretation of the subjunctive developed in chapter 2 was a going project in accounting for object-language modality then it should be able to address the ontic modalities, and chapter 3 showed how to do so; by the same token one would expect that other object-language modalities could be understood in terms of subjunctive conditionals/material rules of inference, and chapter 6 argued that teleological and normative modal claims about organic generation and growth could be understood on this model; within chapter 6 I argued that in order to account for teleological modality some of the paradigmatic features of organic activity must be capable of being given an analysis according to sets of subjunctive conditionals, and I showed that these features could be so analyzed; finally, in chapter 7 I arrived at a constructive account of human persons by analogy with organic generation and growth and I pointed out that if this account had merit we should expect to see it reflected in features of our use of normative and teleological modality that were specific to reasoning about persons, and I argued that this expectation was borne out in the use of teleological imperatives and the principle that ‘ought’ implies ‘can’ (generally) in the domain of agency. I will close out this dissertation by summarizing these results so as to show that the Introduction’s abductive inference is confirmed, and then suggest some of the research this project opens up into.

The burden of this project has been to show that the material inferential interpretation of the subjunctive conditional, together with a subjunctive interpretation of various modalities, underwrites a descriptive metaphysics for the metakinds *chemical*, *organism*, and *person*. In the process I have tried to indicate some of the ways this approach toward metaphysics and modality can be juxtaposed both with ongoing concerns in contemporary metaphysics and philosophy of language, and with various historical discussions. After the Introduction, the dissertation was divided into two halves: one that provided an expressivist theory of modality (chapters 2-4), and



the other articulating the descriptive metaphysics this modal expressivism makes possible (chapters 5-7). The modal expressivism was founded on a development of Sellars' contention that the subjunctive conditional could be understood as the object-language expression of a rule of inference (chapter 2). By treating the subjunctive in this manner it was then possible to use a subjunctive interpretation of the ontic modalities (chapter 3) and of the role of kind terms in reasoning (chapter 4) so as to show that an interconnected set of relations in the world concerning kinds and the powers that individuate them have analogous metalinguistic relations governing the use of kind terms and modal vocabulary in a language whose sentences represent the world. The second half of the dissertation applied this framework to a project in descriptive metaphysics. There I showed that a range of metaphysical commitments concerning chemicals, organisms, and persons could be understood in terms of structural features governing the context-sensitive uses of different modal terms. I did so by employing the material inferential modal expressive resources of chapters 2-4 and arguing (*inter alia*):

- 1) that the representational commitments taken up in reasoning about organic generation and growth as purposive do not commit us to representing chemical processes as purposive (chapter 5);
- 2) that the prospective purposive character of organic generation and growth can be understood to represent that activity as structurally analogous to agency but without representing that activity as itself the sort of thing that proceeds by representing future states (chapter 6); and

- 3) that in the case of animal behavior, the representation of which as purposive *does* commit us to representing that activity as itself proceeding on the basis of a representation of its ends, we can locate the specific difference characteristic of our commitments concerning *rational* activity in virtue of the fact that we represent that activity as proceeding on the basis of a representation of its ends as *rules* that prescribe and proscribe the behavior of the agent and to which she makes herself responsible in the exercise of her rationality (chapter 7).

In the Introduction and at the start of chapter 5 I said that there were two metaphysical divisions that I would aim to make sense of—first concerning the contrast between chemicals on the one hand and persons and organisms on the other, and the second concerning the contrast between organisms and persons. I also said that it would be the aim of the dissertation to defend two sets of claims about the following paragraph—one concerning what is represented about the world in these sentences, another concerning what is expressed by the use of the italicized terms:

We are each of us identical with the human organism we are, and *in virtue of* this identity our lives as persons are bound up with the purposive and normative valences we carry as organisms. But as persons we are capable of rational self-government, and *for this reason* we are different in kind from the merely organic. Nevertheless, considered *qua* the collections of electro-chemical and mechanical processes that constitute organic bodies there are no natural purposes. This is *because* the relation of constitution is not that of identity, *so that* the modal profiles of our organic and personal existences do not pertain to the collections of chemical stuffs that constitute

us at any given time.<sup>95</sup> *In virtue of* these facts an ungrudging recognition of the existence of natural purposes, and the artificial purposes made possible by persons, is compatible with an order of understanding along which there are no purposive events in the world.

Chapters 2-4 argued that the italicized terms commit us to no representational content above that which is used to justify the sentences on which those terms operate, and in virtue of the discussion of chapters 5-7 the representational commitments of that paragraph have been spelled out. Talk of purposive activity represents that activity as having a certain subjunctive structure, and talk of minded and rational purposive activity represents that activity as itself representing the world. But the fact that persons are rationally purposive does not entail that organic generation and growth is rational, for only the former sorts of individuals represent ends as rules that guide behavior. In this way the distinction between organisms and persons is explained. Nor does the fact that organic activity is purposive entail that chemical activity is, for organisms are constituted by and not identical with the chemical stuffs that compose them. In this way the distinction between chemicals on the one side, and organisms and persons on the other, is explained. Because the subjunctive conditional is understood *both* as the object-language expression of a rule of inference *and* a representation of the space of possibility, these representational commitments can be read off our habits of reasoning about different kinds of individual. And yet I have given a view on which the italicized terms in that paragraph play no representational role at all. Instead their function is purely pragmatic: their only role is to express features of the proof system, they are not interpreted via additional model theoretic structure. If we want to know why a given

---

<sup>95</sup> Notice again the rational ('and for this reason') rather than teleological use of 'so that'.

grounding explanation is true or warranted—that is, why the corresponding derivation is a good one—we advert to ordinary inquiry concerning the objects and facts represented in the sentences on which a grounding operator operates. By showing that more fine-grained specification of the material rules of inference suffice to explain the use of these explanatory phrases it is possible to see them as performing a role in relating various kind-specific modal representational features together in a system of reasoning without themselves adding any additional representational structure to that system. Given the discriminatory power this view has shown itself to afford us in understanding our representational commitments, I conclude that the abductive inference that opened this project is one we are entitled to accept: the material inferential modal expressivism developed in the first half of this project makes possible a descriptive metaphysics of kinds.

There are a handful of areas this research can be directed toward in the future, and I will close by considering four. First, it is desirable to have a well-behaved formal system of the form outlined in chapter 2. In particular, it would be good to show that a combined consequence relation consisting of both a formal monotonic fragment constituted by classical (or intuitionistic) logical relations and a material non-monotonic fragment could be defined such that the two fragments are mutually exclusive and jointly exhaustive (my thanks to Robert Brandom for pushing me on this, and for encouraging me to frame the discussion of chapter 2 so as not to require solving this engineering problem). One way forward may be to proceed by looking at attempts to formalize conditionals as update functions on belief sets (as in Rott 2001—my thanks to Greg Wheeler for this suggestion), or perhaps by way of specifying conditions for rejecting an inference one might otherwise accept (thanks here go to Rea Golan). Alternatively it might be worth trying to use model-theoretic tools as a means of interpreting the language and then transposing

that interpretation into an expressivist key (my thanks to Anil Gupta, Jack Samuel, and Greg Wheeler for independently pushing me on this).

Second, this work could be used to engage with contemporary metaphysical projects, particularly concerning talk of metaphysical grounding. Three commitments widespread in the literature on grounding are salient for considering the alternative I have developed here. First, talk of grounding is understood in terms of the *explanations* we give (e.g. Fine 2001 pp.15, 22; Correia 2008 §1.3; deRosset 2013 throughout). So, for instance, the fact that a disjunction is true just in case at least one of its disjuncts is true is supposed to explain why (as many believe) the truth of a disjunction is grounded in its true disjunct(s). Explanatory phrases like ‘because’, ‘for this reason’, and ‘in virtue of’ are supposed to signal these grounding relations, and progress in understanding metaphysical grounding and ontological dependence proceeds by paying attention to the explanations we give (or by paying attention to a privileged class of explanations). Second, these relations are characterized as *ontological dependence* relations, or relations in the order of being (e.g. Correia 2008 throughout; Fine 1991 throughout and 2001 pp.7, 10; Nolan 2011 throughout). Ordinary necessity and possibility are too crude to capture these relations; a whole and its parts in a particular arrangement come to be and pass out of existence at one and the same time across all possible worlds, but it would seem the whole depends on (is grounded in) the parts arranged ‘wholewise’ rather than that the parts and their arrangement depend on the whole. Talk of grounding permits us to make distinctions in the order of being that necessity and possibility are insufficient for. Third, this research tends to be carried on *prescriptively*, resulting in judgments concerning what we ought to think about the metaphysical relation between Socrates and his singleton set, or about the ontological status of things like cities, trees, and bundles of processes (and this despite—because of?—the fact that most of us have not given much thought

to such questions).<sup>96</sup> By contrast, I have accepted the first of these commitments (that metaphysical inquiry proceeds by paying attention to certain sorts of explanations), and combined it with a modified version of the second (trading talk of what explains what in the order of *being* for talk of what explains what in the order of *understanding*) in order to work out a descriptive rather than a prescriptive metaphysics. For by interpreting modal operators in terms of sets of subjunctive conditionals, and interpreting subjunctives as the object-language expressions of rules of inference, it was possible to make out our representational commitments concerning what it is to be a member of various kinds in terms of what it is to reason about those kinds. In the process I have argued that a range of grounding explanations can be understood to perform a pragmatic role in expressing features of a language's proof-system, features that involve no extralinguistic representational commitments beyond those which are implicated by the explanations we give concerning the sentences on which they operate. Though these explanations do represent the terms and sentences of the language as standing in certain relations, that representation is not one that requires we posit referents like 'essence' or 'causal law' to lay alongside whatever objects we are already committed to.

This approach can be extended to engage with contemporary concerns about grounding in more detail. To date there has been a fair amount of effort expended in treating grounding explanations univocally in terms of a model-theory on which they represent metaphysical relations that go beyond what is given by ontic modality.<sup>97</sup> In addition philosophers have tended to focus on simple cases of putative grounding—e.g., the relationship between a whole and the parts con-

---

<sup>96</sup> E.g. Paul (2012) p.6:

[T]he metaphysician should be concerned to prescriptively develop and understand the prior, deep, and general truths about the fundamental natures of the world used to organize and understand the rest of the world.

<sup>97</sup> Daly (2012), Hofweber (2009) and Koslicki (forthcoming) raise reservations about this approach (my thanks to Jack Samuel for drawing this work to my attention).

stituting it arranged in a certain way, and the relationship between an object and its singleton set—in an effort to get clear about what is common across them. But if the view developed in this dissertation is on the right track then it may be that the attention paid to these cases is misguided in assuming that there is some general property or relation that we can gain an understanding of by abstracting away from the details of individual cases of explanation. And I have argued for a view on which these explanatory terms, being purely pragmatic, are representationally transparent—what they represent about the world is particular to the specific representations of the sentences on which they operate. Perhaps something general (and non-minimalist) can be said about truth conditions for grounding explanations, but the approach developed here suggests that the way forward will proceed by paying attention to the details of specific explanations. At any rate it may be that focus on cases like parts and wholes, objects and their singletons, is hobbling our understanding precisely because our practices are not sufficiently detailed as to be a guide for extending the analysis to other domains. Rather than giving in to the prescriptive urge to delimit a view on what grounding really is, metaphysicians interested in these sorts of explanations might profit by paying more attention to the contrastive details of particular cases. Either this method can be generalized and so we can avoid inflating our ontologies to handling grounding explanations, or there will be a point where model-theoretic structure ought to be imported to make sense of some cases. But this dissertation suggests that we do not need to begin right away by supposing that grounding explanations are, simply as such, representing the world in a metaphysically novel sort of way.

Third, it may be possible to extend the more general modal expressivism for metakinds to consider other sorts of entities. Organisms and persons are not the only kinds that have a teleological modal profile—institutions and artifacts do as well. Presumably the role of intentional

agency in the lives of persons will enter into an understanding of how the modal profiles of these latter two kinds of kind are specifically different from the others, just as the role of intentional agency helped differentiate the modal profile of organisms from that of persons. I suspect it is possible to use an understanding of ourselves as evolutionarily and educationally habituated creatures to argue that human persons are artifacts of our institutional practices. It may be possible to carry out this project by looking at interactions between different *qua* expressions. For in some situation it may be that *qua* brother an individual ought to let someone get away with a minor crime, while *qua* police officer that very individual ought do something else. Do these sorts of tensions exhibit anything about how we individuate persons as loci of self-determination caught up in various social contexts at least some of which are constrained by institutional forces no individual can determine otherwise?

Finally, the ability to use a material inferential modal expressivism as a basis for a descriptive inquiry into metaphysics suggests that the historical discussion of the Introduction, and especially the biological model for conceptual genealogies developed there, may be worth more investigation. Our understanding of the history of logic and its relation to metaphysics has grown immensely in the last century. But whereas for much of the history of philosophy, and certainly within 20<sup>th</sup> century Anglophone analytic philosophy, the problem has been that a detailed knowledge of the contexts and traditions that informed the development of logic and ontology has not been easily available, and in some cases those traditions were slighted in favor of a focus on the extensional logics that came to represent the paradigm of logical method as developing out of work in the middle of the 19<sup>th</sup> century (cf. the discussion of sections **1.1.4-1.1.7** of the Introduction), in some ways the current state of scholarly research suffers from a corresponding problem of too *much* information. Today the field of philosophy is so specialized that it is



easy for figures working on issues in contemporary metaphysics to employ resources whose roots to earlier views go undiscussed not because access to that history is not readily available or is regarded as confused, but rather because the constraints of contemporary research make it difficult to see the value in pursuing it. But I think it should be counted a loss that the connection between grounding explanations in analytic metaphysics and medieval and modern notions of material consequence, comprehension, and reduplicative logical terms like ‘*qua*’, for instance, have so far not been the subject of much attention. One might hope that an investigation into these earlier works would pay dividends in sorting out the conceptual space within which we take ourselves to be operating when we go in for philosophical analyses of such things as essence and modality.<sup>98</sup> This is not to say that there has been no attempt whatsoever among analytic metaphysicians to consider the historical roots to their debates; the point is only that to date these attempts are far and away more the exception than the rule. If at the start of the 20<sup>th</sup> century philosophers had access to too little information concerning the development of logic and metaphysics before the rise of mathematical logic in the mid-19<sup>th</sup> century, today contemporary metaphysics may well be suffering from too little interest in the results that the last 100 years has seen in sorting out that history. But reflection on and critique of the work of others in attempting to determine an understanding concerning such things as essence and being, possibility and duty, can galvanize the employment of reason in its activity as a spontaneous act of cognition, synthesizing

---

<sup>98</sup> The conversations among figures like Carnap, Tarski and Gödel in the 1930s, leading to the development of the contrast between model theory and proof theory, syntax and semantics, have substantially shaped our understanding of logic as a discipline with which philosophy is interested in. It may be worthwhile to consider the details of this development as well.

new material in coming to different forms of judgment concerning the topics philosophy has long been interested in.<sup>99</sup>

---

<sup>99</sup> I have offered progressive reflections of this sort, rooted in a reading of the German idealists and the American pragmatists in my (Forthcoming a) and (Forthcoming b)

## APPENDIX A: ARBITRARILY RIGHT AND LEFT NESTED SUBJUNCTIVES

Let ' $\Gamma^\varphi$ ' to denote that set which is a minimal revision of  $\Gamma$  consequent on the supposition of  $\varphi$ , and recall that in the case where  $\varphi$  is compatible with  $\Gamma$  it follows that  $\Gamma^\varphi = \Gamma \cup \{\varphi\}$ .

Derivations for arbitrarily complex right and left nested subjunctives are given as follows. There will be a derivation of  $\varphi > (\psi > \chi)$  at  $\Gamma$  just in case the context  $\Gamma^\varphi$  is such that at that context the additional supposition of  $\psi$  takes one to a context at which there is a derivation of  $\chi$ . To calculate whether  $(\varphi > \psi) > \chi$  is derivable at a context we need the consequence relation to be defined over subjunctive conditionals. And this is to say we need to know how to calculate the role of subjunctive conditionals as part of the premises that constitute a context of inference. This is fixed by  $\mathbf{u}$ . The saturated function

$$\mathbf{u}\langle\Gamma, \varphi > \psi\rangle$$

picks out the set that results from the least revision to  $\Gamma$  on the supposition of  $\varphi > \psi$ . In cases where  $\varphi > \psi$  is already derivable at  $\Gamma$  that is because  $\Gamma^\varphi$  has  $\psi$  as a consequence, and in such a case  $\Gamma^{\varphi > \psi}$  (that is, the set determined by  $\mathbf{u}\langle\Gamma, \varphi > \psi\rangle$ ) is  $\Gamma^\varphi$ . In these cases  $(\varphi > \psi) > \chi$  is derivable just in case  $\chi$  is a consequence of  $\Gamma^\varphi$ . In cases where  $\varphi > \psi$  is not derivable at  $\Gamma$  this is because the set determined by  $\mathbf{u}\langle\Gamma, \varphi\rangle$  does not have  $\psi$  as a consequence. In such a case the value

of  $\mathbf{u} \langle \Gamma, \varphi > \psi \rangle$  is that set most similar to  $\Gamma$  where  $\varphi$  is derivable and  $\psi$  is a consequence; the derivability of  $(\varphi > \psi) > \chi$  is then determined by whether or not  $\chi$  is a consequence of that set.

## APPENDIX B: IMPORT/EXPORT FOR SUBJUNCTIVES IN THE OBJECT-LANGUAGE AND CUMULATIVE UPDATING IN THE METALANGUAGE

Consider the following rule:

**Import/Export:**  $\varphi > (\chi > \psi) \Leftrightarrow (\varphi \& \chi) > \psi$

I will sometimes refer to this condition as ‘**I/E**’. This is an important rule to consider because subjunctive conditionals, on my account, are interpreted as means for expressing the implications that follow from updating premise sets with new information. Some of this updating will be *cumulative* in that the shift from some context  $\Gamma$  to another  $\Delta$  by the addition of a premise does not involve deleting any of the premises already accepted at  $\Gamma$ , so that  $\Delta$  is a superset of  $\Gamma$ :

**Cumulative Updating of a Context:** an update from some context  $\Gamma$  to some context  $\Delta$  is *cumulative* just in case  $\mathbf{c}(\Gamma) \subseteq \mathbf{c}(\Delta)$ .

That **I/E** holds at a context is a function of the fact that the addition of  $\chi$  to a context set including  $\varphi$  is a cumulative update, one that involves no deletions. It follows that to specify the conditions under which **I/E** holds for the subjunctive conditional in the *object-language* is to

specify the conditions under which an update function, in the *metalanguage*, is cumulative. As **I/E** is a contentious principle in the semantics of subjunctives, specifying the conditions in which it holds is no small task.

McGee (1985) and Starr (2014) accept **Import/Export**, though Lange (2009) does not, and the schema is invalid on both Stalnaker and Lewis' semantics (but to my knowledge neither philosopher addresses the issue directly). The problem is that there are cases of right-nested counterfactuals that permit the inference to a conjunctive antecedent (and *vice versa*), while there are other cases that clearly rule it out. As a justification of rejecting importation, Lange gives the following case. It can happen that if you had competed in the race when I did not, you would have won, while if I had competed I would have won even were you competing. This being so, the following is true: If you had won the race, then if I had competed in the race I would have won. But it would be a straightforward contradiction to say that if you had won the race and I had competed, then I would have won (call this case '**Running**'). Still, there are many cases where an inference of the form of **I/E** does sound plausible. What is needed is a principle by which to distinguish the felicitous from the infelicitous cases of **I/E**. If such a principle were found, then we could accept **I/E** for those conditionals that satisfied the principle. Our task, then, is to look for a principle by which to identify cases where **I/E** is valid, and see whether such cases are emblematic of the interpretation of the subjunctive conditional as a material-mode expression of a rule of inference.

I am aware of only one principle that has been advanced as condition on which a general rule ' $\phi > (\chi > \psi) \Leftrightarrow (\phi \& \chi) > \psi$ ' holds; namely, when the following is satisfied:

- 1)  $(\phi > \chi)$

While this condition ensures a class of cases in which **I/E** is valid, it fails to validate many others. For instance, it is true that if the water were to be boiling then if you were to put your hand in it you would be scalded, and the conjunctive counterfactual is true as well, despite the fact that it is false that if it were to be boiling then you would put your hand in it (call this case ‘**Boiling water**’). Requiring that the addition of  $\phi$  commit one to  $\chi$  is too strong a criterion for specifying when the addition of  $\chi$  to a premise set containing  $\phi$  has the same consequences induced by the addition of  $\phi \& \chi$  to that premise set.

What is needed is not that  $\phi$  subjunctively imply  $\chi$ , but that  $\phi$  and  $\chi$  not be such as to subjunctively imply the negation of one another. A number of conditions satisfy this constraint without being as strong as (1). Consider:

$$2) \sim(\phi > \sim\chi)$$

(2) says that it is not the case that the supposition of  $\phi$  at a context rules out  $\chi$ . This condition is likewise too strong, however, as **Boiling Water** still fails to come out as a case in which I/E holds. We might instead try for a sort of converse of (2):

$$3) \sim(\chi > \sim\phi)$$

This condition ensures that the supposition of  $\chi$  at a context does not rule out  $\phi$ , which again ensures that (Import/Export) will be valid for cases in which this condition is met. It also gets the right result with **Boiling Water**, for my sticking my hand in the water would not make it the case

that the water was not boiling. **Running** is also correctly classified as a case in which **I/E** does *not* hold. But consider some hunk of stainless steel at room temperature. Stainless steel has a melting point of about 1500 degrees Celsius. Gold, by contrast, melts at about 1060 degrees C. It will therefore be true that if this hunk of stainless steel were gold ( $\phi$ ) then, if it were heated to 1200 degrees C ( $\chi$ ) it would begin to melt ( $\psi$ ), and that this is true just in case if it were gold and heated to 1200 degrees C it would begin to melt:

$$\phi > (\chi > \psi) \Leftrightarrow (\phi \ \& \ \chi) > \psi$$

But it is surely true that if this hunk of stainless steel were heated to 1200 degrees C it would not thereby become gold:  $\chi > \sim\phi$ . **Import/Export** is warranted yet the condition in question is not met (call this case ‘**Melting Gold**’).

There are two principles that suffice to explain all of the cases I am aware of and which ensure that a class of subjunctives satisfies **I/E**:

$$4) (\phi > \sim(\chi > \sim\phi)) \ \& \ (\chi > \sim(\phi > \sim\chi))$$

$$5) \sim(\phi > (\chi > \sim\phi)) \ \& \ \sim(\chi > (\phi > \sim\chi))$$

(4) requires that with the supposition of  $\phi$  it is not the case that a subsequent supposition of  $\chi$  defeats the implication to  $\phi$ , and that a similar condition holds when  $\chi$  and  $\phi$  are supposed in reverse order. (5) requires that it not be the case that the supposition of  $\phi$  is such that the subsequent supposition of  $\chi$  defeats the implication to  $\phi$ , and that a similar condition holds when  $\chi$  and  $\phi$  are supposed in reverse order.



(4) and (5) both suffice to individuate a class of subjunctives for which **Import/Export** is valid, and each correctly classifies **Running** as case of a failure of **I/E** while classifying **Boiling** and **Gold** as cases where the inference goes through. Because for any  $\phi$  that is consistent (5) entails (4), it suffices to show that (5) classifies the cases correctly. Lange's case **Running** is correctly classified as a case that does not satisfy **I/E** because it does not satisfy (5). If you were to have won the race then if I were to have competed you would not have won:

$$6) (\phi > (\chi > \sim\phi))$$

**I/E** is thereby blocked in this case, as it should be. **Boiling Water** and **Melting Gold** both satisfy (5), however: it is not the case that if the water were boiling then if I were to put my hand in it the water would not be boiling, nor is it the case that if this hunk of stainless steel were gold then if it were to be heated to 1200 degrees Celsius it would not be gold. **I/E** is licensed in these cases, as it should be.

What reason is there to choose between (4) and (5)? I do not know of any counterexamples that tell against any of them, but at any rate it is probably best to make do with as weak a principle as one can, as the conclusion is made stronger thereby. For this reason, I will assume (5) as the condition that licenses **Import/Export**:

$$5) \sim(\phi > (\chi > \sim\phi)) \ \& \ \sim(\chi > (\phi > \sim\chi))$$

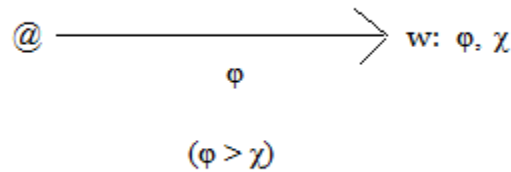
On the material inferential interpretation of the subjunctive conditional, this says that it is not the case that the addition of  $\phi$  as an explicit premise is such that, with the addition of  $\chi$  as an explicit

premise, one must remove  $\phi$  from one's premise set, and that it is not the case that with the addition of  $\chi$  as an explicit premise one must remove  $\chi$  with the addition of  $\phi$ . Call the premises  $\phi$  and  $\psi$  that meet (5) *defeat independent* of one another. Defeat independence ensures that the only cases in which premises accumulate under an update operation are cases in which no premises are lost in going from  $\Gamma$  to a superset  $\Delta$ . And so it happens that **I/E** is valid just in those cases where the set of consequences of the new context  $\Delta$  is a superset of the set of consequences of the old—which was precisely our definition of a cumulative update. As was promised, the solution to **I/E** for subjunctive conditionals in the *object-language* sheds light on the cumulative updating procedure of the *metalanguage*. This reinforces the suggestion that it can be profitable to think of the object-language role of the subjunctive conditional as a transposition into the material mode of a set of claims that give voice to the semantics of the language.

## APPENDIX C: IMPORT/EXPORT IN A POSSIBLE WORLDS SEMANTICS

The condition on **Import/Export** given in appendix **B** holds independently of the material inferential interpretation of the subjunctive conditional, and for this reason it is of interest for possible worlds semanticists. In this appendix I use a possible worlds analysis in a Lewisian frame (one that does not require Stalnaker's assumption that for every  $\phi$  there is always a unique most similar  $\phi$ -world) to show that these conditions validate a class of subjunctives that obey **I/E**. I begin by giving a simple diagram for the subjunctive  $\phi > \chi$ :

**Figure 6:**  $\phi > \chi$



**Reading the diagrams:** The subjunctive conditional at the bottom of the diagram is the proposition whose truth conditions are displayed in the diagram. ‘@’, ‘w’, ‘v’, ‘u’, and ‘t’ denote worlds. ‘@’ denotes the world of evaluation (i.e., the world at which the displayed subjunctive conditional is true). The propositions to the right of a world are those that are true at that world. The arrows indicate a similarity relation, where the proposition adjacent to the arrow ( $\phi$  in this case) indicates that the world at the head of the arrow ( $w$  in this case) is a  $\phi$ -world nearest to the

world at the base of the arrow (@). Because we are working in a Lewisian frame, there may be multiple closest worlds.

The two conditions introduced in appendix **B** are:

$$4) (\varphi > \sim(\chi > \sim\varphi)) \& (\chi > \sim(\varphi > \sim\chi))$$

$$5) \sim(\varphi > (\chi > \sim\varphi)) \& \sim(\chi > (\varphi > \sim\chi))$$

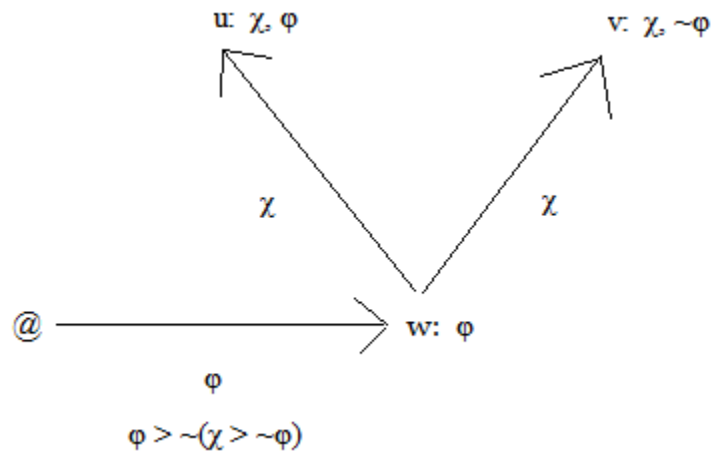
(4) requires that at *all* nearest  $\varphi$ -worlds  $w$ , *some* nearest  $\chi$ -worlds are  $\varphi\&\chi$ -worlds. (5) requires that at *some* nearest  $\varphi$ -worlds  $w$ , *some* nearest  $\chi$ -worlds are  $\varphi\&\chi$ -worlds. Because in each conjunction the two conjuncts have the same logical form (the difference being that  $\varphi$  and  $\chi$  are systematically swapped), in diagramming these conditions I give only a diagram for the first conjunct of each.

The first conjunct of (4):

$$7) \varphi > \sim(\chi > \sim\varphi)$$

says that at the nearest  $\varphi$ -world it is not the case that all of the nearest  $\chi$ -worlds are  $\sim\varphi$ -worlds:

**Figure 7:**  $\varphi > \sim(\chi > \sim\varphi)$

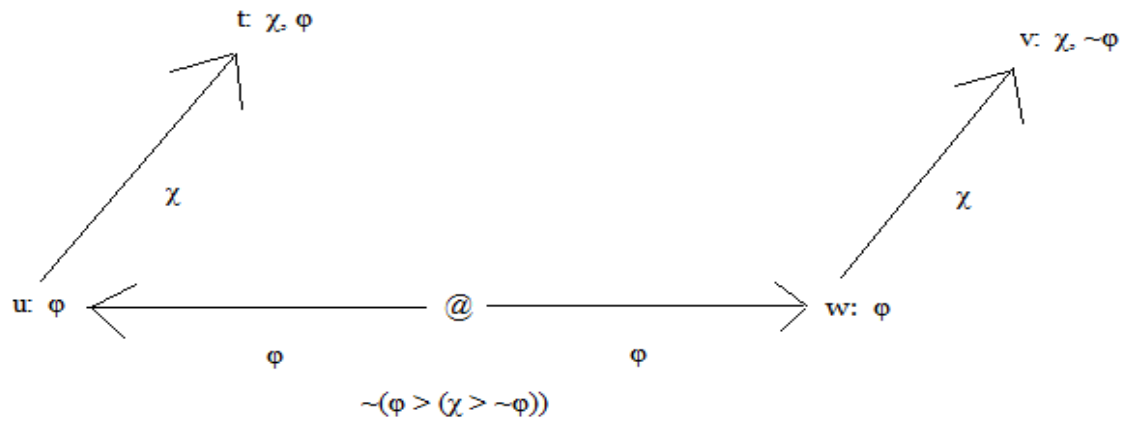


Notice that if it were the case that all the nearest  $\phi$ -worlds were such that all the nearest  $\chi$ -worlds were  $\sim\phi$ -worlds, then  $\phi > (\chi > \sim\phi)$  would be true as well. In such cases  $\phi$  is incoherent—for it subjunctively implies a sentence and its negation. Thus, for any *coherent*  $\phi$  that satisfies the displayed principle, there is some nearest  $\phi$ -world that has a nearest  $\chi$ -world that is a  $\phi\&\chi$ -world (this will be important in the proof that follows). Likewise, the first conjunct of (5):

$$8) \sim(\phi > (\chi > \sim\phi))$$

ensures that some nearest  $\phi$ -world is such that some nearest  $\chi$ -world is a  $\phi\&\chi$ -world:

**Figure 8:**  $\sim(\phi > (\chi > \sim\phi))$



(7) and (8) both suffice to individuate a class of subjunctives for which **I/E** is valid. This can be shown as follows.

Recall that on a Lewisian frame there can be multiple closest worlds. That each of (7) and (8) suffice for validating (Import/Export) follows from the fact that each individuates a class of  $\phi\&\chi$ -worlds (represented by the world  $u$  in the first case and the world  $t$  in the second) that are closest to a class of  $\phi$ -worlds ( $w$  in the first case and  $u$  in the second) that are closest to the actual world, together with the fact that any closest  $\phi\&\chi$ -worlds that are closest to a class of  $\phi$ -worlds that are closest to the actual world are themselves  $\phi\&\chi$ -worlds that are closest to the actual world, and *vice versa*. The first fact is a consequence of the semantics for the subjunctive condi-

tional and is justified by the diagram above. In defense of the latter fact, suppose it were not the case. That is, suppose there was some  $\phi \& \chi$ -world  $s$  closer to the actual world than any closest  $\phi \& \chi$ -worlds  $t$  that are closest to a class of  $\phi$ -worlds  $u$  that are closest to the actual world. If ‘similarity’ is to be an intelligible notion at all, there must be some difference between  $t$  and  $s$  such that we can specify that in virtue of which  $s$  is more similar to the actual world than  $t$ . But there is no specification of a difference between  $t$  and  $s$  available to us—all we know is that they are each worlds in which both  $\phi$  and  $\chi$  are true. This is not to say that we cannot rank the similarity of worlds in which  $\phi$  and  $\psi$  are true for different reasons. When  $\chi$  involves some determinable state of affairs that is independent of  $\phi$ , then worlds in which its determinations are more similar to the actual will be  $\phi \& \chi$ -worlds closer to the actual than other determinations of  $\chi$ . For instance, if this wall (which is actually white) were a darker hue, then worlds in which it is gray will be more similar to the actual than worlds in which it is black. But there is nothing about such rankings that forces us to place the more similar in the  $s$  or the  $t$  classes. It follows that any closest  $\phi \& \chi$ -worlds  $t$  that are closest to a class of  $\phi$ -worlds  $u$  that are closest to the actual world are themselves  $\phi \& \chi$ -worlds that are closest to the actual world. Because of this, when it happens that the closest  $\phi$ -worlds are such that the closest  $\chi$ -worlds are  $\psi$ -worlds (i.e. when  $\phi > (\chi > \psi)$  is true), then it will be the case that the closest  $\phi \& \chi$ -worlds are  $\psi$ -worlds (i.e., that  $(\phi \& \chi) > \psi$  is true). This proves the Importation side of **I/E**. The Exportation direction follows from the fact that  $\chi \& \phi$ -worlds closest to the actual world are no closer to the actual world than are those  $\chi \& \phi$ -worlds that are closest to some  $\phi$ -worlds closest to the actual world. Just as above, no proposition is available to specify that in virtue of which the former class of worlds could be closer to the actual world than the latter.

## APPENDIX D: PROOF OF $(\exists P)\sim(P > \sim\Phi) \Leftrightarrow (\exists P)(P > \Phi)$ ON A LEWISIAN FRAME<sup>100</sup>

For coherent  $p$  and  $\phi$  ' $(\exists p)\sim(p > \sim\phi)$ ' is a consequence of ' $(\exists p)(p > \phi)$ '. The other direction is a bit more involved.

On Lewis' account ' $p > \phi$ ' is true at a world @ just in case there is a sphere of worlds around @ with at least one  $p$ -world (a ' $p$ -permitting sphere'), and ' $p \supset \phi$ ' is true at every world in that sphere. This being so, ' $\sim(p > \sim\phi)$ ' is true at a world @ just in case there is no  $p$ -permitting sphere around @ where ' $p \supset \sim\phi$ ' is true throughout that sphere. And this can happen for one of three reasons:

- i. There is a single sphere around @ containing all the nearest  $p$ -worlds, and that sphere contains both  $p \& \phi$ -worlds and  $p \& \sim\phi$ -worlds. Such a case corresponds to a failure of the uniqueness assumption.
- ii. There is no single sphere around @ that contains all the nearest  $p$ -worlds, but rather an infinite descending set of spheres each of whose worlds are more near to @ than any of the earlier spheres' worlds, and for which there is a perpetual (not necessarily periodic) alternation

---

<sup>100</sup> It will be remembered that Stalnaker's semantics for the counterfactual are a special case of Lewis'.

between  $p \& \phi$ -worlds and  $p \& \sim \phi$ -worlds. This case corresponds to a failure of the limit assumption.

- iii. Finally, ' $\sim(p > \sim \phi)$ ' can be true at @ because there is a single  $p$ -world containing sphere around @ all of whose worlds are more near to @ than any world outside, and ' $p \supset \phi$ ' is true at all the worlds within this sphere. This condition can be satisfied either because the limit assumption holds and there is a single sphere nearest to @, or because the limit assumption fails and all of the infinitely many nearer spheres never contain a  $p \& \sim \phi$ -world.

Notice that it is only when there are both  $p \& \phi$ -worlds and  $p \& \sim \phi$ -worlds that vie for similarity to @, as in conditions (i) and (ii), that the truth of ' $\sim(p > \sim \phi)$ ' does not entail the truth of ' $(p > \phi)$ '. The third condition, by contrast, satisfies the truth conditions for that latter sentence. To show that Lewis' system validates the implication from ' $(\exists p)\sim(p > \sim \phi)$ ' to ' $(\exists p)(p > \phi)$ ' then, it is enough to show that conditions (i) and (ii) cannot be met.

$$(\exists p)\sim(p > \sim \phi) \Rightarrow (\exists p)(p > \phi)$$

Take the contraposition of the above implication:

$$1. \sim(\exists p)(p > \phi) \Rightarrow \sim(\exists p)\sim(p > \sim \phi)$$

By quantifier equivalences, this is equivalent to:

$$2. (\forall p)\sim(p > \phi) \Rightarrow (\forall p)(p > \sim \phi)$$

It will be this implication that we prove. Assume the antecedent:

$$3. (\forall p)\sim(p > \phi)$$

Let a *maximal proposition* (denoted by ' $p^*$ ') be a conjunction of all and only those propositions that are true at a given possible world  $w^*$ . Consider all the maximal propositions  $p^*$ . Because the



quantifier in (3) is a universal, every  $p^*$  satisfies (3). And because every  $p^*$  is maximal, each such proposition will be true at just one world—namely, the world  $w^*$ . As there is only one  $p^*$  world, there is *a fortiori* only one  $p^*$  world nearest to any point of evaluation  $w$ . This being so, the  $p^*$ -sphere around the world of evaluation @ will contain only  $w^*$ . Because worlds are fully determinate, the world  $w^*$  will be one in which  $\phi$  is either true or false. And because of this, conditions (i) and (ii) cannot be the truth-makers for ' $\sim(p^* > \phi)$ '—for these two conditions require worlds in some closest sphere, or infinitely descending set of closer spheres, in some of which ' $\phi$ ' is true and in others of which ' $\sim\phi$ ' is true. And so it is only condition (iii) that can satisfy instances of (3) when maximal propositions stand in for ' $p$ '. Each maximal proposition  $p^*$ , then, will be a  $\sim\phi$ -world, and so it is condition (iii) that makes ' $\sim(p^* > \phi)$ ' true for every maximal proposition  $p^*$ . That is, (3) is true for every maximal proposition because ' $(p^* > \sim\phi)$ ' is true for every maximal proposition. Additionally, there is a one-to-one correspondence between the set of maximal propositions and the set of possible worlds, for each maximal proposition is a conjunction of all and only those sentences that are true at some one possible world. This means that *every world* is a  $\sim\phi$ -world.

But now consider the truth conditions for ' $\sim(q > \phi)$ ', an instantiation of (3) on some arbitrary non-maximal proposition  $q$ . We need to show that conditions (i) and (ii) cannot be met in this case as well. For condition (i) to be met there would have to be some sphere around  $w$  such that there is at least one  $q \& \phi$ -world in that sphere. But by the argument in the last paragraph there are no such worlds (for every world is a  $\sim\phi$ -world). Similarly, even if there were to be an infinite descending set of spheres each of whose worlds are more similar to  $w$  than those of the last (corresponding to a failure of the limit assumption), there cannot be a perpetual alternation between  $q \& \phi$ -worlds and  $q \& \sim\phi$ -worlds, again because there are no  $\phi$ -worlds. This being so,

condition (iii) is the only truth maker for ' $\sim(q > \phi)$ ', and so it follows that the truth of ' $\sim(q > \phi)$ ' entails the truth of ' $(q > \sim\phi)$ '. Because ' $q$ ' was chosen arbitrarily it follows that ' $(\forall p)\sim(p > \phi) \Rightarrow (\forall p)(p > \sim\phi)$ '. By quantifier equivalences and contraposition, then, it follows that ' $(\exists p)\sim(p > \sim\phi) \Rightarrow (\exists p)(p > \phi)$ '.

## APPENDIX E: VALIDATING A PRINCIPLE OF INFERENCE

There is a principle of inference that is regularly used in natural language:

$$[\Box(\phi > \psi)] \Rightarrow [\phi > \Box\psi]$$

While this inference schema is invalid on Lewis' semantics (and all possible worlds semantics I am familiar with), I will show that on the theory under consideration here this inference is valid precisely for those sentences that satisfy Import/Export. Understanding why this is so, and showing how our pre-existing habits regarding the employment of this inference track the criteria of goodness to be specified, will reinforce the case that a material inferential interpretation of the subjunctive conditional and a subjunctive interpretation of the ontic modalities deserve consideration as an alternative to the possible worlds and metalinguistic approaches to these issues.

There are occasions in which it makes sense to affirm a sentence of the following form:

1)  $\phi > \Box\psi$

e.g., if the core of the reactor were to reach X degrees Celsius, a meltdown could not be stopped; if the wire were wrapped in plastic it could not electrocute you. One might go on to explain that these relations hold because of a necessary connection between  $\phi$  and  $\psi$ . For example, if asked why the reactor meltdown could not be stopped once the core reached a certain temperature, one could explain the causal connection that holds between uranium of such-and-such mass and temperature and the chain reaction of nuclear fission that would result. That is, one might go on to explain how it is necessary that if the core were to reach X degrees, a meltdown would occur:

$$2) \quad \Box(\phi > \psi)$$

But there is a modal fallacy lurking in this vicinity. While the K-axiom is valid for most ontic modal logics:

$$K) \quad \Box(\phi \supset \psi) \Rightarrow \Box\phi \supset \Box\psi$$

the sentence ' $\phi \supset \Box\psi$ ' does not follow from the antecedent of (K). Just so, one cannot infer that  $\psi$  is necessary from  $\phi$  and ' $\Box(\phi \supset \psi)$ '. The subjunctive version of the inference:

$$3) \quad \Box(\phi > \psi) \Rightarrow \phi > \Box\psi$$

is invalid as well.

One might propose to dissolve the problem by interpreting the natural language sentences above so as to have a depth-grammar where the modal has wide scope. But we habitually use modus ponens to detach the modalized consequent, and this would force us to give an error theory for a bit of reasoning we habitually employ. And yet, were this equivalence to hold, we could derive from the tautology:

$$4) \quad \Box(\phi > \phi)$$

that every proposition was necessarily true:

$$5) \quad \phi > \Box\phi$$

This is obviously false in the object-language. A fact is not necessary simply because it occurred.

It does seem that once the core reaches X degrees the meltdown is assured, and this in virtue of the lawlike causal connection between the temperature, mass, and nuclear properties of some hunk of uranium: the modalized consequent detaches, and an explanation is given in the wide-scope formulation. While an equivalence between these two formulae is invalid on most

modal logics, it holds on a subjunctive interpretation of the ontic modalities for those propositions that satisfy Import/Export:

$$\text{Proof of } (\forall p)[p > (\varphi > \psi)] \Leftrightarrow [\varphi > (\forall p)(p > \psi)]^{101}$$

Suppose:

$$(\forall p)[p > (\varphi > \psi)]$$

Take an arbitrary instance with ‘ $q$ ’ for ‘ $p$ ’.

$$q > (\varphi > \psi)$$

By the Importation direction of (Import/Export) it follows that the nearest  $q \& \varphi$ -worlds are  $\psi$  worlds:

$$(q \& \varphi) > \psi$$

By the Exportation direction of (Import/Export):

$$\varphi > (q > \psi)$$

By a universal generalization on  $q$ :

$$(\forall p)[\varphi > (p > \psi)]$$

Finally, because  $\varphi$  does not contain occurrences of  $p$  bound by the quantifier:

$$[\varphi > (\forall p)(p > \psi)]$$

(The other direction is similar.)

It is worth reflecting on why this inference goes through when the domain of quantification satisfies Import/Export. When we instantiate the first universal generalization on an arbitrary  $q$ , Importation is licensed only for those  $q$  for which ‘ $\sim(\varphi > (q > \sim\varphi))$ ’ holds. This condition specifies that  $q$  does not rule out a commitment to  $\varphi$ . By contrast, the Exportation direction of

---

<sup>101</sup> On the restriction that  $\varphi$  contains no unbound occurrences of  $p$ .

the inference is satisfied when it also follows that ' $\sim(q > (\phi > \sim q))$ '—that is, when  $\phi$  does not rule out commitment to  $q$ . These conditions ensure that the only cases in which this scope interaction is irrelevant are cases where the propositions in the domain of the quantifier are *defeat independent* with regard to  $\phi$ —the addition of  $\phi$  does not defeat an inference to any of the sentences in the domain of quantification, and none of those sentences defeat an inference to  $\phi$ . Once again, the metalinguistic interpretation of the subjunctive conditional is fit to explain certain features of the object language (in this case, a principle of inference).

As was pointed out above, however, there is an obvious objection against accepting this equivalence. For from it and the tautology:

$$6) \quad \Box(\phi > \phi)$$

we can prove that every proposition is necessarily true if true at all:

$$7) \quad \phi > \Box\phi$$

To accept this entailment without restriction is to make every proposition necessary: in a sort of inversion of the T axiom, every sentence will be such that it entails its own necessitation. Assuming the system satisfies the T axiom, at this point the notion of necessity collapses into actuality, and we are not left with anything that should be seen as articulating material inferential relations. For whatever a modal operator does by way of marking off inferential relations in the object-language, it had better make discriminations with regard to the propositions it is true of and those it is not if its object-language use is to count as marking anything off. As this last set of issues threatens to separate the object-language interpretation of modals and the subjunctive conditional from the material inferential interpretation they are supposed to go proxy for, I take the ability to illuminate these issues from within a material inferential frame to be a criterion of adequacy for the view.

The first thing to do is to specify just what sort of updating function is at work when this equivalence holds. In the service of doing so I will introduce a bit more notation. Let the quantifiers be subscripted with indices for recording the domain restrictions from the context of discourse that the modal induces. In general these restrictions will be quite numerous, for at any context there will be all manner of defeat-independent premises that must be kept track of for determining whether a modal marks a cumulative update in that context. In this case, however, we need only consider a domain whose elements are defeat-independent of  $\varphi$ :

$$8) (\forall p_{\varphi})[p > (\varphi > \varphi)]$$

And if we are not to equivocate then we must keep the domain of quantification constant. It falls out of the model that any domain whose premises are defeat-independent of  $\varphi$  is a domain in which, no matter what one adds to the premises, the addition of  $\varphi$  underwrites the drawing of an inference to  $\varphi$ . This is a mere containment implication; it tells us nothing about what that premise set implies by way of propositions not contained within it. But then we have that:

$$9) \varphi > (\forall p_{\varphi})(p > \varphi)$$

and this, too, is evidently trivial. For it says that, were one to add  $\varphi$  to a set of premises, then any other premise that was defeat-independent from  $\varphi$  is such that, were it added to the premises, one could still infer  $\varphi$ . Once again, this is a mere containment implication. (9) permits detachment only when  $\varphi$  is part of the premise set. In general this involves updating from a context  $\Gamma$  to a context  $\Gamma'$  where  $\varphi \in \Gamma'$ . And at such a  $\Gamma'$  it follows from containment that  $\varphi$  can be inferred under any additional supposition defeat-independent from  $\varphi$ . Here there is no material connection to communicate. When  $\varphi$  is containment-implied the inference in question relies on nothing beyond the content of  $\varphi$  itself: that which makes  $\varphi$  subjunctively stable in such contexts is the inclusion of  $\varphi$  in that context, rather than a material inferential connection between  $\varphi$  and some

other thought. On plausible assumptions about the way the world works, once one has added  $\phi$  to a premise the license to assert  $\phi$  in some context is never revoked—a given assertion of  $\phi$  may not be particularly relevant to some ongoing concern of the moment, but one is not in any epistemic trouble by asserting a sentence that is part of the domain.<sup>102, 103</sup>

Contrast this with a case where some  $\psi$  distinct from  $\phi$  is implied under a strong necessity modal. That the following holds of some determinate  $\phi$  and  $\psi$ :

$$9) \quad \phi > (\forall p_{\phi})(p > \psi)$$

is no mere artifact of the context induced by the antecedent. That  $\psi$  is subjunctively robust under all premises defeat-independent of some *distinct content*  $\phi$  is an expression of a material inferential connection between  $\psi$  and  $\phi$ . It is true that in this case as well the update to a  $\Gamma$  that contains  $\phi$  permits one to assert  $\phi$  no matter how one updates the context (compatible with  $\phi$ ); but here  $\phi$  is once again derived trivially by its inclusion in the context—this is universal assertability, not necessity as a material inferential relation between two distinct contents. The assertion of ‘if  $\phi$  were to be the case then, no matter what,  $\phi$  would be the case’ does not mark any inferential relations between  $\phi$  and a distinct thought; it does not tell us anything we did not already know.

---

<sup>102</sup> If it happens that  $\phi$  is not contained in  $\Gamma$  then it will not follow that at  $\Gamma$  all premises that are defeat-independent of  $\phi$  subjunctively imply  $\phi$ —for there may be *no reason to assert*  $\phi$  at  $\Gamma$ . But when there are *no* defeaters for  $\phi$  then  $\phi$  is necessary:  $\sim(\exists p)(p > \sim\phi) \Leftrightarrow (\forall p)(p > \phi)$ .

<sup>103</sup> I recognize that in making this move I am allowing that irrelevant implications can be expressed by a subjunctive conditional, and so that, via containment implications as one such case, we allow a sense in which every proposition entails its own necessity. Nevertheless, I hope to have sufficiently disarmed that seeming absurdity by explaining that, because it does not encode material inferential relations, it is an artifact of the setup. It may be that subjunctive conditionals are hardly ever used to assert irrelevant connections, and that if they are they involve a use of ‘even if’ in such a way that they should receive a separate treatment in the semantics. These points are consistent, however, with a stipulation that, in this setting, irrelevant implications will be accepted, and the resulting limit-cases of necessitation countenanced. I do not know what would settle this question, but I take it to be worth trying to specify a clear sense of the issue and proceed to draw some tentative conclusions on that basis. I am also aware that there is a sense in which an ‘even if’ connection *does* express a material inferential relation, though only negatively—in some contexts it is doubtless informative that an inference from  $\phi$  to  $\psi$  would remain good even under the additional supposition that  $\chi$ .



While ‘ $\phi > (\forall p_\phi)(p > \phi)$ ’ comes out as a tautology on this account, its triviality is explained by the fact that such theorems do not encode material inferential relations, and this fact is exhibited in the containment-implications that such sentences are interpreted as expressing. And so we need not fear the collapse of actuality into necessity; the material inferential interpretation of the subjunctive conditional is still a live option. This discussion also opens up the prospect for giving a clear exposition of a set of nested necessities—e.g., logical, metaphysical, physical, environmental, etc. For each would specify a domain of suppositions that the modals quantify over in permitting cumulative updating, with each successive domain being larger for each successively stronger modal force. This leaves us in a position to see that material inferential relations are at the cornerstone of our knowledge of the world, and that necessitation modalities tell us something about the large-scale structure of those relations. More specifically, if the subjunctive conditional is interpreted as an object-language device for tracking material implications across premise sets, the ontic modals can be interpreted as quantifiers ranging over subjunctive suppositions, and thereby as object-language devices for marking structural features of these inferential relations.

## BIBLIOGRAPHY

- Anderson, A. R. and N. D. Belnap (1975). *Entailment: The Logic of Relevance and Necessity. Vol. 1.* Princeton: Princeton University Press.
- Anderson, A. R., N.D. Belnap, and J.M. Dunn (1992). *Entailment: The Logic of Relevance and Necessity. Vol. 2.* Princeton: Princeton University Press.
- Anscombe, Gertrude E.M. (1985) “Has Mankind One Soul—An Angel Distributed Through Many Bodies?” *Human Life, Action and Ethics: Essays by G.E.M. Anscombe*, edited by M. Geach and L. Gormally. Exeter: Imprint Academic: 17-26.
- Aquinas, St. Thomas (1981). *Summa Theologica, Five Volumes.* Translated by the Fathers of the English Dominican Province. Westminster: Christian Classics.
- Aristotle (1985). *Nicomachean Ethics.* Translated, with introduction, notes, and glossary by Terence Irwin. Indianapolis: Hackett Publishing Company.
- Arnauld, Antoine and Pierre Nicole (1996). *Logic or the Art of Thinking.* Translated and edited by Jill Vance Buroker. New York: Cambridge University Press.
- Bäck, Allan (1996). *On Reduplication: Logical Theories of Qualification.* New York: E.J.Brill.
- Bar-Am, Nimrod (2008). *Extensionalism: The Revolution in Logic.* New York: Springer Science + Business Media.
- Bennett, Jonathan (1974). Review of *Counterfactuals* by David Lewis. *Canadian Journal of Philosophy* 4: 381-402.
- (2003). *A Philosophical Guide to Conditionals.* New York: Oxford University Press.
- Bird, Alexander (2007). *Nature’s Metaphysics: Laws and Properties.* New York: Oxford University Press.

- Blackburn, Simon (1987). "Morals and Modals". In *Fact, Science and Morality* edited by G. MacDonald and C. Wright. Oxford: Basil Blackwell.
- Bochenski, Joseph M. (1961). *A History of Formal Logic*. Translated and edited by Ivo Thomas. Notre Dame: University of Notre Dame Press.
- Boyer, Carl B. (1968). *A History of Mathematics*. New York: John Wiley and Sons.
- Brandom, Robert B. (1994). *Making It Explicit: Reasoning, Representing, and Discursive Commitment*. Cambridge: Harvard University Press.
- (2008). *Between Saying and Doing: Towards an Analytic Pragmatism*. New York: Oxford University Press.
- (2011). *Perspectives on Pragmatism: Classic, Recent, and Contemporary*. Cambridge: Harvard University Press.
- (2014). *From Empiricism to Expressivism: Brandom Reads Sellars*. Cambridge: Harvard University Press.
- Brock, William H. (1993). *The Norton History of Chemistry*. New York: W.W. Norton and Company.
- Buller, David J. (1998). "Etiological Theories of Function: A Geographical Survey" *Biology and Philosophy* 13: 505-527.
- Capozzi, Mirella and Gino Roncaglia (2009). "Logic and Philosophy of Logic from Humanism to Kant" in Haaparanta (2009): 78-158.
- Carnap, Rudolph (1934). *Logical Syntax of Language*. Translated by Amethe Smeaton. Chicago: Open Court Publishing (2002).
- Chalmers, David J., David Manley, and Ryan Wasserman (eds.) (2009). *Metametaphysics: New Essays on the Foundations of Ontology*. New York: Oxford University Press.
- Chisholm, Roderick M. (1946). "The Contrary-to-Fact Conditional". *Mind* 55: 289-307.
- Correia, Fabrice (2008). "Ontological Dependence" *Philosophy Compass* 3 (5): 1013-1032.
- Correia, Fabrice and Benjamin Schnieder (eds.) (2012). *Metaphysical Grounding: Understanding the Structure of Reality*. New York: Cambridge University Press.

- Cummins, Robert (2002). "Neo-Teleology". In *Functions and Functional Analysis in the Philosophy of Biology and Psychology* edited by Andrew Ariew, Robert Cummins, and Mark Perlman. New York: Oxford University Press.
- Curry, Haskell (1963). *Foundations of Mathematical Logic*. New York: McGraw-Hill.
- Daly, Chris (2012). "Skepticism about Grounding". In Correia and Schnieder (2012): 81-100.
- DeRose, Keith (1991). "Epistemic Possibilities". *The Philosophical Review* 100 (4): 581-605.
- (1999). "Can It Be That It Would Have Been Even Though It Might Not Have Been?". *Philosophical Perspectives* (13): 385-413.
- deRosset, Louis (2013). "Grounding Explanations". *Philosophers' Imprint* 13(7): 1-26.
- Dewey, John (1925). *Experience and Nature*. New York: Dover Publications (1958).
- Dumitriu, Anton (1977). *History of Logic (Four Volumes)*. Translated by Duiliu Zamfirescu, Dinu Giurcăneanu, and Doina Doneaud. Kent: Abacus Press.
- Dummett, Michael (1981). *Frege: Philosophy of Language*, 2<sup>nd</sup> Edition. Cambridge: Harvard University Press.
- Dutilh Novaes, Catarina (2011). "The Different Ways in which Logic is (said to be) Formal". *History and Philosophy of Logic* (32): 303-332.
- (2012). "Reassessing Logical Hylomorphism and the Demarcation of Logical Constants". *Synthese* (185): 387-410.
- (Forthcoming). "Conceptual Genealogy for Analytic Philosophy". In *Beyond the Analytic-Continental Divide: Pluralist Philosophy in the Twenty-First Century* edited by J. Bell, A. Cutrofello, and P.M. Livingston. Routledge Studies in Contemporary Philosophy.
- Ellis, Brian (2001). *Scientific Essentialism*. New York: Cambridge University Press.
- (2002). *The Philosophy of Nature: A Guide to the New Essentialism*. Ithaca: McGill-Queen's University Press.
- Fine, Kit (1975). Review of *Counterfactuals* by David Lewis. *Mind* 84: 451-8.
- (1991). "A Study of Ontology". *Noûs* 25 (3): 263-294.
- (2001). "The Question of Realism". *Philosophers' Imprint* 1 (1): 1-30.

- (2003). "The Non-Identity of a Material Thing and Its Matter" *Mind* 112 (446): 195-234.
- (2006). "Arguing for Non-Identity: A Response to King and Frances". *Mind* 115 (460): 187-210.
- (2012a). "A Guide to Ground". In Correia and Schnieder (2012): 37-80.
- (2012b). "Counterfactuals without Possible Worlds". *Journal of Philosophy* 109 (3): 221-246.
- Frege, Gottlob (1950). *The Foundations of Arithmetic: A Logico-Mathematical Inquiry into the Concept of Number*. Translated by J.L. Austin. Evanston: Northwestern University Press.
- (1972). *Conceptual Notation and Other Works*. Translated and edited by Terrell Ward Bynum. Oxford: Oxford University Press.
- Gabbay, Dov M. and John Woods (eds.) (2004). *Handbook of the History of Logic, Volume 1: Greek, Indian and Arabic Logic*. Amsterdam: Elsevier.
- Geach, Peter T. (1980). *Reference and Generality: An Examination of Some Medieval and Modern Theories*, 3<sup>rd</sup> Edition. Ithaca: Cornell University Press.
- Gentzen, Gerhard (1934). *Untersuchungen über das logische Schliessen I*. Translated by Manfred Szabo as "Investigations into Logical Deduction". *American Philosophical Quarterly* 1 (4) (1964): 288-306.
- (1935). *Untersuchungen über das logische Schliessen II*. Translated by Manfred Szabo as "Investigations into Logical Deduction: II". *American Philosophical Quarterly* 2 (3) (1964): 204-218.
- Gibbard, Allan (1975). "Contingent Identity". *Journal of Philosophical Logic* 4 (2): 187-221.
- Goodman, Nelson (1983). *Fact, Fiction, and Forecast*, 4<sup>th</sup> Edition. Cambridge: Harvard University Press.
- Gupta, Anil (1980). *The Logic of Common Nouns: An Investigation in Quantified Modal Logic*. New Haven: Yale University Press.
- Hannikainen, Ivar (2011). "Might-Counterfactuals and the Principle of Conditional Excluded Middle". *Disputatio* IV (30): 127-149.
- Haaparanta, Leila, (ed.) (2009). *The Development of Modern Logic*. New York: Oxford University Press.

- Hegel, G.W.F. (1991). *The Encyclopedia Logic*. Translated by T.F. Geraets, W.A. Suchting, and H.S. Harris. Indianapolis: Hackett Publishing Company, Inc.
- (2010). *The Science of Logic*. Translated by George di Giovanni. New York: Cambridge University Press.
- Hofweber, Thomas (2009). "Ambitious yet Modest Metaphysics". In Chalmers, Manley, and Wasserman (2009): 260-289.
- Ippolito, Michela (2013). *Subjunctive Conditionals: A Linguistic Analysis*. Cambridge: MIT Press.
- James, William (1956). *The Will to Believe and Other Essays in Popular Philosophy*. New York: Dover Publications.
- Jacobs, Jonathan D. (2010). "A Powers Theory of Modality; or, How I Learned to Stop Worrying and Reject Possible Worlds". *Philosophical Studies* 151 (2): 227-248.
- Kneale, William and Martha Kneale (1962). *The Development of Logic*. New York: Oxford University Press.
- Kant, Immanuel (1992). *Lectures on Logic*. Translated and edited by J. Michael Young. New York: Cambridge University Press.
- (2000). *Critique of the Power of Judgment*. Translated by Paul Guyer and Eric Matthews, edited by Paul Guyer. New York: Cambridge University Press.
- Kratzer, Angelika (1977). "What 'Must' and 'Can' Must and Can Mean". *Linguistics and Philosophy* 1 (3): 337-356.
- Kripke, Saul (1980). *Naming and Necessity*. Cambridge: Harvard University Press.
- Koslicki, Kathrin (Forthcoming). "The Coarse-Grainedness of Grounding". In *Oxford Studies in Metaphysics* edited by K. Bennett and D. Zimmerman. Oxford: Oxford University Press.
- Knuuttila, S. (1993). *Modalities in Medieval Philosophy*. New York: Routledge.
- Kvart, Igal (1986). *A Theory of Counterfactuals*. Indianapolis: Hackett Publishing Company.
- Lange, Marc (2009). *Laws and Lawmakers: Science, Metaphysics, and the Laws of Nature*. New York: Oxford University Press.

- Levi, Isaac (2012). "Beware of Syllogism". In *Pragmatism and Inquiry: Selected Essays* by Isaac Levi. New York: Oxford University Press.
- Lewis, Clarence I. (1918). *A Survey of Symbolic Logic: The Classic Algebra of Logic*. New York: Dover Publications (1960).
- Lewis, David (1973). *Counterfactuals*. Malden: Blackwell Publishing.
- (1979). "Counterfactual Dependence and Time's Arrow". In *Philosophical Papers, Vol. II*. New York: Oxford University Press (1986): 32-66.
- Lowe, E.J. (1989). "What is a Criterion of Identity?". *The Philosophical Quarterly* 39 (154): 1-21.
- (1997). "Objects and Criteria of Identity". *A Companion to the Philosophy of Language* edited by Bob Hale and Crispin Wright. Malden: Blackwell Publishers: 613-633.
- (2009). *More Kinds of Being: A Further Study of Individuation, Identity, and the Logic of Sortal Terms*. Malden: Wiley-Blackwell.
- Łukasiewicz, Jan (1957). *Aristotle's Syllogistic From the Standpoint of Modern Formal Logic*, 2<sup>nd</sup> Edition. New York: Oxford University Press.
- MacFarlane, John (2000). *What does it Mean to say that Logic is Formal?* Ph.D. Dissertation, University of Pittsburgh.
- McGee, Vann (1985). "A Counterexample to Modus Ponens". *The Journal of Philosophy* 82 (9): 462-471.
- Millikan, Ruth G. (1984). *Language Thought and Other Biological Categories*. MIT Press: Cambridge, MA.
- (1989). "In Defense of Proper Functions". *Philosophy of Science* 56: 288-302.
- (1993). *White Queen Psychology and other essays for Alice*. MIT Press: Cambridge, MA.
- Müller, Max (ed.) (1884). *The Upanishads vol. 2, Sacred Books of the East Series, vol.15*. Oxford: Clarendon Press.
- Nagel, Ernest (1977). "Teleology Revisited: Goal-Directed Processes in Biology". *Journal of Philosophy* 74: 261-301.

- Neander, Karen (1991). "The Teleological Notion of 'Function'". *Australasian Journal of Philosophy* 69 (4): 454-468.
- Negri, Sara and Jan Von Plato (2001). *Structural Proof Theory*. New York: Cambridge University Press.
- Nolan, Daniel (2011). "Categories and Ontological Dependence". *The Monist* 94 (2): 277-301.
- Norton, John (2003). "A Material Theory of Induction". *Philosophy of Science* 70: 647-670.
- (2011). "History of Science and the Material Theory of Induction: Einstein's Quanta, Mercury's Perihelion". *European Journal for Philosophy of Science* (1): 3-27.
- (2014). "A Material Dissolution of the Problem of Induction". *Synthese* 191: 671-690.
- (Manuscript). *The Material Theory of Induction*.
- Papineau, David (1993). *Philosophical Naturalism*. Cambridge: Basil Blackwell.
- Paul, Laurie A. (2012). "Metaphysics as Modeling: The Handmaiden's Tale". *Philosophical Studies* 160: 1-29.
- Peckhaus, Volker (2009). "The Mathematical Origins of Nineteenth-Century Algebra of Logic". In Haaparanta (2009): 155-195.
- Peirce, Charles Sanders (1867). "Upon Logical Comprehension and Extension". *Proceedings of the American Academy of Arts and Sciences* 7: 416-432.
- (1868). "Some Consequences of Four Incapacities". In *The Essential Peirce: Selected Philosophical Writings, Vol. 1 (1867-1893)* edited by Nathan Houser and Christian Kloesel. Bloomington: Indiana University Press (1992): 28-55
- (1869). "Grounds of the Validity of the Laws of Logic". In *The Essential Peirce, Vol.1*: 56-82.
- (1878a). "How to Make our Ideas Clear". In *The Essential Peirce, Vol.1*: 124-141.
- (1878b). "Deduction, Induction, and Hypothesis". In *The Essential Peirce, Vol. 1*: 186-199.
- (1885). "On the Algebra of Logic: A Contribution to the Philosophy of notation". *American Journal of Mathematics* 7 (2): 180-196.



- (1901). "On the Logic of Drawing History from Ancient Documents, Especially Testimonies". In *The Essential Peirce: Selected Philosophical Writings, Volume 2 (1893-1913)* edited by the Peirce Edition Project. Bloomington: Indiana University Press (1998): 75-114.
- (1905a). "Issues of Pragmaticism". In *The Essential Peirce: Volume 2*: 346-359.
- (1905b). "Critical Common-Sensism". In *Philosophical Writings of Peirce* edited by Justus Buchler. New York: Dover Publications (1955): 290-301.
- (1906). "Pragmatism in Retrospect: A Last Formulation". In *Philosophical Writings of Peirce*: 269-289.
- (1910). "On the Doctrine of Chances, with Later Reflections". In *Philosophical Writings of Peirce*: 157-173.

Pollock, John L. (1976). *Subjunctive Reasoning*. Boston: D. Reidel Publishing Co.

Prawitz, Dag (1965). *Natural Deduction: A Proof-Theoretical Study*. New York: Dover Publications (2006).

Price, Huw (1997). "Naturalism and the Fate of the M-Worlds". *Aristotelian Society Supplementary* 71: 247-282.

- (2003). "Models and Modals". <http://philsci-archive.pitt.edu/2307/1/Models-and-Modals.pdf>.
- (2004). "Naturalism without Representationalism". In *Naturalism in Question* edited by Mario De Caro and David Macarthur. Cambridge: Harvard University Press: 71-88.
- (2008). "Will there be Blood? Brandom, Hume, and the Genealogy of Modals". *Philosophical Topics* 36 (2): 87-97.
- (2011a). "Expressivism for Two Voices". In *Pragmatism, Science and Naturalism* edited by J. Knowles and H. Rydenfelt. New York: Peter Lang International Academic Publishers: 87-113.
- (2011b). *Naturalism without Mirrors*. New York: Oxford University Press.
- (2013). *Expressivism, Pragmatism, and Representationalism*. New York: Cambridge University Press.
- (2014) "Causation, Intervention and Agency—Woodward on Menzies and Price" <http://philsci-archive.pitt.edu/9930/1/WoodwardFinal.pdf>.

- (unpublished). "Expressivism for Three Voices". Talk given at the Sellars Centenary Conference, University College Dublin, June 6-8 2012 (this is an expanded version of Price 2011).
- Redding, Paul (2003). "Hegel and Peircean Abduction". *European Journal of Philosophy* 11, (3): 295-313.
- Reichenbach, Hans (1976). *Laws, Modalities, and Counterfactuals*. Edited with a Foreward by Wesley C. Salmon. Berkeley: University of California Press.
- Rott, Hans (2001). *Change, Choice, and Inference: A Study of Belief Revision and Non-monotonic Reasoning*. New York: Oxford University Press.
- Schaffer, Jonathan (2009). "On What Grounds What". In Chalmers, Manley, and Wasserman (2009): 347-383.
- Sellars, Wilfrid (1948). "Concepts as Involving Laws and Inconceivable without Them". *Philosophy of Science* 15 (4): 287-315.
- (1949). "Language, Rules, and Behavior". In *John Dewey: Philosopher of Science and Freedom* edited by Sidney Hook. New York: The Dial Press: 289-315.
- (1953). "Inference and Meaning". In *In the Space of Reasons: Selected Essays of Wilfrid Sellars* edited by R. Brandom and K. Scharp. Cambridge: Harvard University Press (2007): 3-27.
- (1958). "Counterfactuals, Dispositions, and the Causal Modalities". *Minnesota Studies in the Philosophy of Science, Volume II: Concepts, Theories, and the Mind-Body Problem* edited by Herbert Feigl, Michael Scriven, and Grover Maxwell. Minneapolis: University of Minnesota Press: 225-308.
- (1962). "Philosophy and the Scientific Image of Man". In Brandom and Scharp (2007): 369-408.
- (1967). *Science and Metaphysics: Variations on Kantian Themes*. Atascadero: Ridgeview Publishing Company (1992).
- (1974). "Meaning as Functional Classification: A Perspective on the Relation of Syntax to Semantics". In Brandom and Scharp (2007): 81-100.
- (1975). "Autobiographical Reflections". In *Action, Knowledge, and Reality: Critical Studies in Honor of Wilfrid Sellars* edited by Hector-Neri Castañeda. Indianapolis: Bobbs-Merrill: 277-293.

- (1979). "More on Givenness and Explanatory Coherence". In *Perceptual Knowledge* edited by Jonathan Dancy. New York: Oxford University Press (1988): 177-191.
- Sider, Theodore (2011). *Writing the Book of the World*. New York: Oxford University Press.
- Stalnaker, Robert (1968). "A Theory of Conditionals". In *Causation and Conditionals* edited by Ernest Sosa. New York: Oxford University Press (1974): 165-179.
- Starr, William B. (2014). "A Uniform Theory of Conditionals". *Journal of Philosophical Logic* 43 (6): 1019-1064.
- Stovall, Preston (2014). "Abductive Inference, Autonomy, and the Faith of Abraham". In *Interpreting Abraham: Journeys to Moriah* edited by Bradley Beach and Matthew Powell. Minneapolis: Fortress Press.
- (Forthcoming a). "Inference by Analogy and the Progress of Knowledge: From Reflection to Determination in Judgments of Natural Purpose" *British Journal of the History of Philosophy*.
- (Forthcoming b) "The Lamp of Reason and the Mirror of Nature". In an anthology edited by Randall Auxier, as yet untitled. Lanham: Lexington Books.
- (Forthcoming c). "Syllogistic Inference as the Ground of the Content of Judgment: A Line of Thought from Kant through Hegel to Peirce". *European Journal of Philosophy*.
- Strawson, Peter.F. (1959). *Individuals: An Essay in Descriptive Metaphysics*. Garden City: Anchor Books.
- Thomasson, Amie (2007). "Modal Normativism and the Methods of Metaphysics, *Philosophical Topics* 35 (1&2): 135-160.
- (2009). "Non-Descriptivism about Modality: A Brief History and Revival". *Baltic International Yearbook of Cognition, Logic and Communication* 4 (200 Years of Analytical Philosophy): 1-26.
- Thompson, Michael (2008). *Life and Action: Elementary Structures of Practice and Practical Thought*. Cambridge: Harvard University Press.
- Wiggins, David (2001). *Sameness and Substance Renewed*. New York: Cambridge University Press.
- Williams, J. Robert G. (2010). "Defending Conditional Excluded Middle". *Noûs* 44 (4): 650-668.

Williamson, Timothy (1990). *Identity and Discrimination* (Cambridge: Basil Blackwell).

--- (2007). *The Philosophy of Philosophy* (Malden: Blackwell Publishing).

Wilson, Mark (2007). "Ghost World: A Context for Frege's Context Principle". <http://philsci-archive.pitt.edu/3375/>.

Wimsatt, William C. (1972). "Teleology and the Logical Structure of Function Statements". *Studies in the History and Philosophy of Science* 3(1): 1-80.

Wright, Larry (1973). "Functions". *Philosophical Review* 82: 139-168.

--- (1976). *Teleological Explanations*. Berkeley: University of California Press.